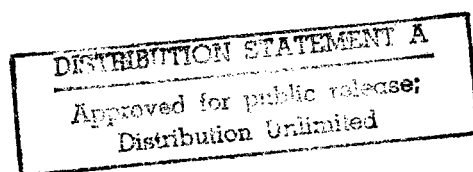


# ***JPRS Report***



# **Nuclear Developments**

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# Nuclear Developments

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## CONTENTS

25 APRIL 1989

### CHINA

Plant Acquires Soviet Industrial Accelerator [ZHONGGUO XINWEN SHE] .....	1
Discussion on 2d Daya Bay Nuclear Plant .....	1
Official on Chances for Plant [Hong Kong SOUTH CHINA MORNING POST 31 Mar] .....	1
Soviet Technology 'Likely' [Hong Kong SOUTH CHINA MORNING POST 3 Apr] .....	2
Joint Committee Concerned [Hong Kong SUNDAY STANDARD 2 Apr] .....	3
Plans for 2d Daya Bay Nuclear Plant Denied [Hong Kong HONGKONG STANDARD 6 Apr] .....	4
Official Affirms No Plans for 2d Daya Plant [Hong Kong SOUTH CHINA SUNDAY MORNING POST 9 Apr] .....	4
Status of Isotope, Radiation Industries Viewed [ZHONGGUO XINWEN SHE] .....	5
Nuclear Society Chief Cites Need To Develop Nuclear Power [Hong Kong HSIN WAN PAO 31 Mar] .....	5

### EAST ASIA

#### JAPAN

Nuclear Reactor Shut Down After Malfunction [KYODO] .....	8
---	---

#### PHILIPPINES

Proposal To Operate Nuclear Power Plant Rejected [Manila Radio] .....	8
---	---

#### VIETNAM

Atomic Research Institute Produces Isotopes [Hanoi Radio] .....	8
---	---

### EAST EUROPE

#### INTRABLOC AFFAIRS

GDR Symposium on Radiation Protection Opens [NEUES DEUTSCHLAND 5 Apr] .....	9
---	---

#### CZECHOSLOVAKIA

Paper Says Nuclear Power Plant Site Safe [Prague Radio] .....	9
---	---

#### GERMAN DEMOCRATIC REPUBLIC

Nuclear Information Agreement With Sweden [East Berlin Radio] .....	9
---	---

#### HUNGARY

Nuclear Cooperation Agreement With CSSR Urged [MTI] .....	9
---	---

### LATIN AMERICA

#### ARGENTINA

CNEA Inaugurates Nuclear Reactor in Algeria [TELAM] .....	10
Nuclear Official Returns From Algeria [TELAM] .....	10
Missile Project With Egypt Reportedly Canceled [NOTICIAS ARGENTINAS] .....	10
Condor II Development With Egypt To Continue [NOTICIAS ARGENTINAS] .....	11
Uranium Solvent-Extraction Plant Completed [TELAM] .....	11
Alfonsin Attends Atucha Nuclear Plant Ceremony [TELAM] .....	11

## BRAZIL

'Tricks' To Gain Nuclear Technology Disclosed [O GLOBO 9 Apr]	11
Submarine Reactor Development Efforts Increasing [O GLOBO 9 Apr]	12
Scientists To Try Cold Nuclear Fusion [O ESTADO DE SAO PAULO 5 Apr]	13
Uranium Enrichment Process Perfected [O GLOBO 9 Apr]	13
CNEN Director Describes Miniplant Program [O GLOBO 9 Apr]	15
Nuclear Miniplant Project Described [O GLOBO 9 Apr]	15

## NEAR EAST & SOUTH ASIA

### BANGLADESH

Ershad Stresses Implementation of Nuclear Project [Dhaka International]	16
---	----

### INDIA

Nuclear Scientist Comments on Pakistan's Plans [PATRIOT 18 Feb]	16
Concern Expressed Over Pakistani Nuclear Program [Delhi Radio]	16
Criteria for Commissioning of Narora Plant Told [THE HINDU 27 Feb 89]	16
Feasibility of Uranium Recovery To Be Studied	17
Work at Bhabha Center [THE TIMES OF INDIA 1 Mar]	17
Indian Rare Earths Plans [THE TIMES OF INDIA 23 Feb]	18
Scientists To Verify Nuclear Fusion Process [Delhi Radio]	18
Budget Provides More Funding for Atomic Energy [THE HINDU 3 Mar]	18

### IRAN

Majlis Speaker Visits Missile Research Center [Tehran Radio]	18
Nuclear Weapons Program Reportedly Started [MENA]	19

### IRAQ

IAEA Official Confirms Peaceful Nuclear Usage [INA]	19
---	----

### ISRAEL

U.S. No Longer Able To Ignore Nuclear Status [HADASHOT 6 Apr]	19
Reported U.S. Ban on Scientists Termed Rubbish [Tel Aviv Radio]	20
Commentator on Possible Bombing of Iraqi Reactor [YEDI'OT AHARONOT 2 Apr]	20
Heavy Water Pact With Norway 'Scrapped' [THE JERUSALEM POST 4 Apr]	20
FRG Defense Minister Discusses Proliferation During Visit	21
On Anxiety Over Missile [Hamburg DPA]	21
Arens Asks About Missile [Hamburg DPA]	21
Arens Expresses Concern [Jerusalem Radio]	21
Maltese Radio Reports 'New' Israeli Reactor [Malta Radio]	21

### PAKISTAN

Daily Notes Success in Missile, Rocket Production [JANG 21 Mar]	22
Gandhi Says Pakistan Close To Making Nuclear Bomb [Delhi Radio]	22

## SOVIET UNION

Construction of Krasnodarskaya Atomic Plant Halted [SOTSIALISTICHESKAYA INDUSTRIYA 28 Mar]	23
Chernobyl Area Measures, Radiation Levels Reported [Moscow TV]	23
Trade Unions, IAEA Meet To Discuss Nuclear Energy Safety	24
USSR's Shalayev Speaks [TRUD 8 Apr]	24
Joint Document Presented [TRUD 9 Apr]	25

## WEST EUROPE

### EUROPEAN AFFAIRS

- Text of EC, Japan Accord on Nuclear Fusion Research  
[Luxembourg *OFFICIAL JOURNAL OF THE EUROPEAN COMMUNITIES* 28 Feb] ..... 26

### FEDERAL REPUBLIC OF GERMANY

- Chancellor Kohl on Nuclear Waste Management [DPA] ..... 37

### IRELAND

- Radioactive Waste Disposal Site Under Consideration [IRISH INDEPENDENT 25 Feb] ..... 38

### UNITED KINGDOM

- BBC Program on Condor Missile Development [London TV] ..... 38  
Local Workers Oppose Nuclear Sub Berth at Tilbury [THE DAILY TELEGRAPH 17 Mar] ..... 45  
Radioactive Incident Monitoring Network Opened [THE DAILY TELEGRAPH 17 Mar] ..... 45

**Plant Acquires Soviet Industrial Accelerator**  
*HK1404055289 Beijing ZHONGGUO XINWEN SHE*  
*in Chinese 0744 GMT 13 Apr 89*

["Soviet-Made Industrial Electronic Accelerator  
Installed in Beijing—ZHONGGUO XINWEN SHE  
headline]

[Text] The installation in the Beijing General Electric Wire Plant of an industrial electronic accelerator—Soviet-made radiation processing equipment of the early 1980's advanced level, which uses nuclear technology—was completed yesterday. Now the accelerator has formally gone into operation. At the same time, the establishment of a productive electronic radiation associated company—the first in Beijing—conrun by the plant and the Atomic Scientific Research Institute of the Ministry of Nuclear Industry, was also announced.

Radiation processing technology is a new processing technology, which has risen rapidly in the last 20 years. The world's output value of the radiation processing industry in 1985 was more than \$10 billion. Later on it grew at a steady rate of 15 to 25 percent a year. However, China's radiation processing industry took off late and is now just at a stage of early development.

According to statistics, 80 percent of high-tension electric wire needed for the production of color television sets in China is imported. Off-shore oil platforms are in urgent need of various nonflammable electronic radiation wires and cables. The cables used to equip a platform cost \$1.2 million. In addition, auto, computer, power, aviation, and space aviation industries also urgently expect a rapid expansion in the radiation processing industry and service from it.

The establishment of the Beijing Electronic Radiation Associated Co. will play a role in satisfying the pressing needs, such as developing and spreading the extensive use of electronic radiation technology and expediting the production of electronic radiation, cross linking electric wires, cables, and mnemonic thermocondensation materials.

**Discussion on 2d Daya Bay Nuclear Plant**

**Official on Chances for Plant**  
*HK3103053989 Hong Kong SOUTH CHINA*  
*MORNING POST in English 31 Mar 89 p 1*

[By Andy Ho]

[Text] The Chinese authorities are considering an initial \$23.4 billion investment in a second nuclear power plant at Daya Bay, a senior Chinese nuclear official said in Beijing yesterday.

Mr Jiang Shenjie, a technical adviser to the Chinese Nuclear Industry Development Corporation, said the existing Daya Bay supporting facilities could save the second scheme of up to \$1.56 billion in infrastructure development.

He said the Daya Bay region in Guangdong Province—about 30 kilometres northeast of the border—had the capacity for housing at least four nuclear power plants.

Mr Jiang, who also heads the Chinese Society of Nuclear Science, said the capital needed for the scheme could be shared between the central government and Guangdong Province.

He estimated the price tag for the second plant at about \$23.4 billion, which is slightly cheaper than the \$28.8 billion scheme now being developed on the site by a Sino-Hong Kong utility concern, the Guangdong Nuclear Power Joint Venture Company (GNPJVC).

However, unlike the first Daya Bay project, the Chinese authorities have no immediate plans to invite partners from outside the mainland to take part in the second one.

The Chinese authorities have long expressed an interest in building an additional nuclear power plant at Daya Bay, but Mr Jiang is the first senior official to spell out details of the ambitious plan.

Mr Jiang, a former vice-minister of the Nuclear Industry Ministry, said Beijing's recent decision to slow down industrial investments would not bog down developments in nuclear power generation.

Transportation and energy production were among the industries that would not be adversely affected by the economic cut-backs, he added.

Mr Jiang said the two 1,000 megawatt reactors for the proposed second station would be more powerful than the first set of Daya Bay facilities.

The GNPJVC will install two French-designed 900 megawatt pressurised water reactors in its Daya Bay station.

Mr Jiang said priority would be given to nuclear power projects as the mainland had been suffering from an under-supply of coal fuel.

He noted that China lost more than \$400 billion in national industrial output because of insufficient electricity supply.

Mr Jiang, also a former director of the national Nuclear Safety Administration, stressed that a second nuclear power plant at Daya Bay would not compromise safety.

"Whether there are two or four plants, it will be the same as far as the safety co-efficient is concerned. The present pressurised water reactors are not of the same model as the Russian ones," he said.

Its stable seismic structure and supporting infrastructure, including piers and highways, have turned Daya Bay into an ideal site for nuclear power stations, said Mr Jiang.

He added that China would have adequate nuclear waste storage facilities to deal with future spent uranium fuel from its atomic power plants.

**Soviet Technology 'Likely'**  
*HK0304014789 Hong Kong SOUTH CHINA  
MORNING POST in English 3 Apr 89 pp 1, 6*

[By Andy Ho and Jimmy Leung]

[Text] China is highly likely to import Soviet nuclear technology through barter trade for its second atomic power plant at Daya Bay, according to a senior Chinese nuclear official in Beijing.

Mr Jiang Shengjie, technical adviser to the Chinese Nuclear Industry Development Corporation, said talks with the Soviets could start as soon as a Daya Bay Phase II feasibility study was completed.

The Chinese plan to install Soviet reactors at Daya Bay has drawn immediate objections from a 117-group anti-nuclear lobby in Hong Kong.

The Joint Conference for the Shelving of the Daya Bay Nuclear Plant yesterday said they had no confidence in the operational standards of the Soviet-made pressurised water reactors that China intended to buy for the second project.

The Soviet Union already has a barter contract with China to supply two 600-megawatt pressurised water reactors to the northeastern Chinese province of Liaoning, a base of Chinese heavy industries.

Soviet President Mikhail Gorbachev will seal the contract with China during his historic summit meeting with Chinese paramount leader Deng Xiaoping in Beijing next month.

Mr Jiang said a similar arrangement might be adopted for the Guangdong province's second Daya Bay station, to be developed next to a \$28.8 billion Sino-Hong Kong nuclear power joint venture now under construction about 30 kilometres northeast of the border.

The former vice-minister of the Nuclear Industry Ministry said it would be convenient for China to turn to the Soviet Union for two 1,000-megawatt pressurised water reactors for Daya Bay as Liaoning had set a successful precedent.

He conceded that China did not have the massive capital to invest in its atomic power schemes and barter trade was a handy solution.

Mr Jiang, however, did not specify what China would offer the Soviet Union in exchange for its nuclear technology.

"It is very likely that the Liaoning model would be used for Guangdong. The facilities concerned are pressurised water reactors, which are the same as the French design (for the first Daya Bay station).

"Some Soviet experts have already come for technical discussions. We are aware that the Chernobyl-type graphite-moderated reactors are not reliable," he said.

Mr Jiang, who used to head the National Nuclear Safety Administration (China's nuclear licensing authority), said the Soviet equipment to be imported was advanced by world standards and would not be second-hand facilities.

There were 14 such reactors operating smoothly in the Soviet Union, he said.

Mr Jiang said Sino-Soviet co-operation in the civil nuclear field was possible because of the present cordial political atmosphere between the two nations. He described present Chinese trade links with the Soviet Union as unprecedented.

The feasibility study on the \$23.4 billion second Daya Bay station has yet to start.

The document can be compiled within six months and it will then take another half year to complete a separate safety analysis.

The Daya Bay feasibility survey would likely be conducted by the Beijing Number Two Nuclear Industry Design Research Institute, which was also responsible for the Liaoning study, Mr Jiang said.

It was unlikely, he added, that Guangdong would go ahead with further nuclear power projects before 1995, when the second Daya Bay plant was scheduled to come on stream.

"A province cannot spend too much money. Guangdong is predominantly light industry-led and does not consume much electricity. Even if a fifth reactor unit is to be installed in the province, I suppose it will be a matter for the next century," he said.

Mr Jiang, head of the Chinese Society of Nuclear Science and a respected figure in the nuclear circle on the mainland, noted that China's nuclear fuel reserve could comfortably cater to the needs of its civil nuclear facilities, particularly after recent cutbacks in military use of uranium.

Meanwhile, the local anti-nuclear lobby has pledged to launch a series of protest actions against China's proposal to build a second nuclear power plant at Daya Bay.

A leader of the joint conference, Mr Lau Chin-shek, said yesterday they would petition the Hong Kong branch of the NEW CHINA NEWS AGENCY and the Office of Members of the Executive and Legislative Councils.

"I would like to ask Hong Kong's legislators whether they will support the latest proposal since the second plant would be constructed entirely by the Chinese without Hong Kong participation," Mr Lau said.

China, he added, had until now not yet made public how it would handle the radioactive wastes from its nuclear plants.

Mr Lau denounced another phase of development at Daya Bay as being detrimental to the stability of Hong Kong and the confidence of its people. "One million signatures from Hong Kong calling for the shelving of the initial scheme have been ignored," he said.

Another leader of the coalition, the Reverend Fung Chi-wood, said the only reason to support the second scheme was economic considerations as it could cut costs in manpower and infrastructure development.

"Without foreign investment or participation, Hong Kong people would probably not be told of any mishap during construction and after the plant has come on stream.

#### **Joint Committee Concerned**

*HK0204023689 Hong Kong SUNDAY STANDARD in English 2 Apr 89 p 3*

[By Vivian Tse and Stanley Leung]

[Text] The Sino-Hong Kong advisory committee on nuclear safety wants to hold an urgent meeting later this week to examine Beijing's plan for a second nuclear plant at Daya Bay.

The plan is expected to spark fresh controversy over the safety aspects of nuclear operations near Hong Kong.

A number of committee members expressed grave concern yesterday and said they would seek more information from Beijing.

The urgent meeting is being called by the chairman of the 14-member Nuclear Safety Consultative Committee in Daya Bay, Mr Wong Po-yan, who has voiced opposition to the plan, saying it would make Hong Kong residents even more fearful about the future than they are already.

Mr Wong told the SUNDAY STANDRD yesterday that he has informed all committee members of his plan to call an urgent meeting this week but has yet to hear from them.

Some members contacted by the the SUNDAY STANDARD, including Professor Poon Chung-kwong and Dr Raymond Wu, supported Mr Wong's suggestion.

An anti-nuclear coalition of over 100 groups will hold a press conference this afternoon to announce their position.

Legislative Councillor Mr Martin Lee Chu-ming, who heads OMELCO's [Organization of Members of the Executive and Legislative Councils] environmental affairs panel, also joined the call yesterday for Beijing to scrap the plan.

"If China insists on going ahead with the construction without consulting Hong Kong, I think it is totally insensitive to the fears of the Hong Kong people," he said.

Mr Lee is considering raising the issue in the Legislative Council or its committees.

Mr Wong said "It is inappropriate to build more nuclear reactors in Daya Bay in the face of local residents' lingering phobia towards nuclear power."

He said the committee would ask Chinese authorities for more details on the plan.

Another committee member, Dr Raymond Wu, a medical doctor and a Basic Law drafter, said China's plan is certain to intensify residents' fear of nuclear plants.

"The Chinese Government should give public opinion first priority before reaching a conclusion on the proposal," said Mr Wu.

Although he declined to make a specific comment on the issue until more information was available, he admitted the final say rested with China.

Professor Yeung Mankit, of the University of Hong Kong's mechanical engineering faculty, said Hong Kong residents' fears were understandable but stressed that it is common practice to build more than two nuclear reactors at a single site.

Another committee member, Legislative Councillor and Professor Poon Chung-kwong, said he needed more detailed information, but said his main concern was whether Chinese or foreign equipment was to be used in the proposed nuclear plant.

Mr Jiang Shengjie, a technical adviser to the Chinese Nuclear Industry Development Corporation, has said a second plant at the site would not increase the safety risk.

**Plans for 2d Daya Bay Nuclear Plant Denied**  
*HK0604083189 Hong Kong HONGKONG STANDARD in English 6 Apr 89 p 1*

[By Tammy Tam of the China Desk]

[Text] China yesterday officially denied it planned to build another nuclear power-plant at Daya Bay.

It also said it had not asked Guangdong authorities to conduct a feasibility study on the project.

Mr Wang Wenze, spokesman of the Energy Ministry under the State Council, said he had no information on the widely reported new plant for Daya Bay.

But the head of the planning section of the Guangdong Power Planning Institute, Mr Chen Shouzeng, said it was given the task of site selection by the Energy Ministry and the provincial government.

"We were asked to conduct the feasibility studies by the Ministry early this year and, of course, the provincial government," Mr Chen said.

He said work had not started on investigations into whether Daya Bay would be suitable for another plant.

"We will do that in the second stage of our job," he said.

The first stage was focused on Taishan, a county in southern Guangdong.

Last week, technical adviser to the Chinese Nuclear Industry Development Corporation, Mr Jiang Shenjie, told some Hong Kong reporters Guangdong was going to build its second nuclear plant in Daya Bay next year, and that Soviet-made pressurised water reactors would be installed.

He also said Guangdong was doing feasibility studies which would be completed late this year.

This drew immediate objections from anti-nuclear groups and Hong Kong people.

Mr Wang said his ministry had not asked Guangdong to do the feasibility studies, but "I can look into the matter."

"Up to now, all the information I have got on the new nuclear plant is from the Hong Kong press. I personally don't know who Mr Jiang is. The Energy Ministry has not granted the right to Mr Jiang to talk about the construction of an additional nuclear plant," Mr Wang said.

He said the building of any nuclear plant would be planned by the state.

"The Energy Ministry has an overall plan for power development. Local governments can have their own intentions (for building nuclear power plant), but the final say is with the State Council," he said.

When asked whether China would use Soviet-made reactors in future, Mr Wang said: "We have not come to such specific arrangements."

The Soviet Union's deputy trade representative to China, Mr Anatoly Litiagin, had earlier said it was interested in helping develop nuclear power in China.

But Mr Chen said the selection of a site was not a simple matter.

"Daya Bay may not be the ideal site for the second plant because it is quite far away from Guangzhou, which consumes the bulk of electricity supply in the province," he said.

**Official Affirms No Plans for 2d Daya Plant**  
*HK0904024089 Hong Kong SOUTH CHINA SUNDAY MORNING POST in English 9 Apr 89 p 4*

[By Kent Chen]

[Text] A senior Chinese official has confirmed that China has no immediate plans to build a second nuclear power plant at Daya Bay.

The Deputy Secretary of the Hong Kong and Macao Affairs Office, Li Hou, said plans for a second plant in Guangdong Province were still at the preliminary stage, and that Hong Kong's concerns about the project would be taken seriously before any final decision was made.

Local anti-nuclear lobbyists yesterday called for close attention to be paid to the choice of the site for a second nuclear power plant in Guangdong.

Their call followed China's denial of the existence of a plan to build the second plant at Daya Bay, which it issued to the British Embassy in Beijing on Friday [7 April].

Although the British Government was told reports of plans for a second power plant at Daya Bay were false, the Joint Conference for the Shelving of the Daya Bay Plant said China should openly rule out the plan.

News that China was planning another nuclear project at Daya Bay with Soviet-built reactors whipped up a storm of protest in Hong Kong. But Mr Li, speaking from Beijing, said any final decision would rest with the State Council, and at the moment the subject was not even on the agenda.



He admitted that in reaching any decision the State Council would have to consider the psychological effect that building a second power plant at Daya Bay would have on Hong Kong, and gave his assurance that the Hong Kong and Macao Affairs Office would take public concern into account.

Mr Li told people not to worry, but warned that there would be a need for a second power plant in Guangdong to meet future energy requirements.

The Joint Conference anti-nuclear body yesterday renewed its suggestion that more effective channels should be established between Hong Kong people and the government agencies responsible for nuclear power on matters concerning the Daya Bay plant and other nuclear power plants in Guangdong.

"They should let Hong Kong people reflect their anxiety and opinion and inform Hong Kong people of their plan, which will be beneficial to Hong Kong as well as China," a statement issued by the joint conference said.

In their petition to the Office of Members of the Executive and Legislative Councils, 10 representatives of the joint conference—the umbrella body of 117 anti-nuclear groups—said the issue did not end with China's denial.

The plan for a second nuclear plant at Daya Bay was first disclosed last Thursday by Jiang Shengjie, a technical adviser to the Chinese Nuclear Industry Development Corporation.

Confusion was caused by a denial of any such plan three days later by Wang Wenzhe, spokesman for the China's Energy Ministry under the State Council.

#### **Status of Isotope, Radiation Industries Viewed**

HK1204044389 Beijing ZHONGGUO XINWEN SHE  
in Chinese 1244 GMT 7 Apr 89

["The Development of China's Isotope and Radiation Industries Is Just Unfolding"—ZHONGGUO XINWEN SHE headline]

[Text] Vice general manager of China Isotope Co. Zhou Jiaxian said today that China has set up a comparatively perfect network for the application of, and research on, nuclear technology for agriculture. China has cultivated a total of 285 new agricultural varieties using radiation technology, ranking high among countries throughout the world.

China's isotope and radiation industries mainly include: isotope and its products, nuclear instruments and apparatus, accelerators, radiation processing, nuclear agriculture, and nuclear medicine. Zhou Jiaxian added that China began studying and developing this industrial technology, which has initially grown into a new industry, as soon as it entered upon the nuclear undertaking.

In "The State Council's Decision on the Main Points of Current Industrial Policies" published on 15 March of this year, the isotope and radiation industries, as new industries, were among those that will be developed at present.

Zhou said that China's accelerator industry, which has built up a sound foundation, has succeeded in manufacturing 90 accelerators of 10 kinds and 80 ion instillers, and succeeded in building two production lines for manufacturing medical electronic straight-line accelerators. The manufacturing of the positive and negative electron collider indicates that China's accelerator technology has approached the international level.

The radiation processing industry is considered very promising. China now has 150 cobalt and 60 irradiation installations, with a capacity reaching 16 million curies, including 25 accomplished cobalt source installations with a designed capacity running at over 100,000 curies each, and five that are still under construction. The energy-loading capacity of the biggest installation comes to 4 million curies. At the same time, China is building 25 irradiation accelerators, with power totaling 3 million kilowatts.

Nuclear technology has found application in more than 1,000 medical establishments, and there are three nuclear medical centers in China, treating 70 million patient-times every year. Various kinds of medical equipment incorporating nuclear technology play an important role in identifying cancer at an early stage.

Zhou Jiaxian said China's isotope and radiation industries represent a special high-tech domain. Their output value is to the tune of 150 million yuan, which is very small, despite the comparatively sound foundation; they still lag behind other countries.

Zhou Jiaxian made a speech at the inaugural meeting of the "China Isotope and Radiation Trade Association." He hoped that international exchange and cooperation in this regard will be carried out vigorously, and technology and funds imported to speed up the development of these industries.

#### **Nuclear Society Chief Cites Need To Develop Nuclear Power**

HK0704102189 Hong Kong HSIN WAN PAO in  
Chinese 31 Mar, 1, 2 Apr 89

[Article by staff reporter Chen Shao-chiang on interview with Jiang Shengjie, president of the China Nuclear Society: "The Mainland Urgently Needs To Develop Nuclear Power Stations"]

[31 Mar p 2]

[Text] Beijing, 31 Mar—The backwardness in China's energy industry development has become an increasingly serious factor that hampers the normal development of

the country's economy. The long-standing shortage of electricity supply has aggravated the fall in industrial output. Statistics suggest that last year's electric power shortage left 20 percent of the country's industrial production capacity unused, thereby causing a loss of 200 billion yuan. Taken as a whole, the country's power shortage was registered at almost 80 billion kilowatt-hours (equivalent to 16 million kilowatts) last year.

This serious power shortage has enabled people to understand that thermal power generation (by coal) and hydropower generation can no longer meet the increasing social demand and that there is an urgent need to build more nuclear power stations.

Apart from Guangdong (Daya Bay) and Zhejiang (Qin Shan), some provinces where power supply falls short of demand, including Fujian, Liaoning, Jiangxi, and Jiangsu, have applied to the State Council to build nuclear power stations.

Building nuclear power stations is not so simple as building thermal power stations. In the first place, the problem of nuclear safety must be solved, the ground structure of the relevant site must be studied, and the influence on the surrounding environment must be taken into consideration. In addition, building a nuclear power station requires huge funds of at least several billion U.S. dollars. Under the present economic conditions, can China afford the cost? Can society withstand the strain?

Jiang Shengjie, Chinese nuclear expert, former vice minister of nuclear industry, and now president of the China Nuclear Society, explained these issues during an interview with this reporter.

Because it takes a long time to build a power station, the relevant department must draw up a long-term program in line with specific conditions, he pointed out. Some of China's "long-term plans" only cover up to the year 2000, and this cannot meet the demand for the long-term development of nuclear power stations, which require long-term investment.

Calculations by the Ministry of Energy Resources indicate that China will be able to maintain the present level of coal-powered electricity generation until the year 2000, he said. But in the early part of next century hydropower exploitation will reach its limits, and coal-powered electricity generation will be restricted due to difficulties in coal excavation and transportation. Therefore developing nuclear power stations "is a matter of great urgency."

Jiang Shengjie said: All the nuclear power stations planned and being built will generate 6.3 million kilowatts of electricity (about 20 billion kilowatt-hours) annually during the period up to the year 2000. This will not help solve the power shortage the country is facing. However, the construction of nuclear power stations

should proceed step-by-step and steadily. The 900,000-kilowatt Guangdong Daya Bay nuclear power station and the 300,000-kilowatt Zhejiang Qin Shan nuclear power station are the only sources from which China can gain valuable experience in the construction of nuclear power stations. The experiences of these two nuclear power stations should be studied in close coordination so as to draw up detailed and explicit methods and measures, with the aim of formulating a complete long-term program for the development of nuclear power stations.

#### [1 Apr p 1]

[Text] Beijing, 1 Apr—Building nuclear power stations requires plans of a more long-term nature than constructing other kinds of power stations. As early as 10 years ago, China began to consider building a nuclear power station, but the plan for building such a station was turned down "on two occasions" by the relevant department due to a lack of scientific support. Subsequently, no firm decision was made on the construction of nuclear power stations, and this was unfavorable to the exploitation of nuclear power and the development of the country's economy.

It takes a long time and a large investment to build a nuclear power station, Jiang Shengjie said, adding that results cannot be easily seen from building one or two nuclear power stations. Apart from this, China also lacks experience in building and operating nuclear power stations, and it will take time to master the technology and gain experience. He pointed out that a plan for the development of nuclear power stations should be arranged at least up to the year 2015. A "long-term program" up to the year 2000 is obviously inadequate.

He remarked that so far China had not worked out an overall, regular, and long-term development plan for nuclear power stations. It is inappropriate just to do feasibility studies for individual projects instead of drawing up an overall and comprehensive plan, he added. It requires huge amounts of human, material, and financial resources to start the construction of a nuclear power station, and the cost in this respect far exceeds that for its capital construction. Therefore it is necessary to formulate a long-term program to consider the development of a nuclear power station by comparing it with other power stations. In this way scientific support will be provided for the development of a nuclear power station according to objective needs and possibilities.

In 1988 many power stations in China faced a coal shortage due to a lack of transportation facilities. Officials from the China Coal Corporation and coal producing regions disclosed that China's coal resources have always been poorly managed and have lacked a uniform plan. As a result, individuals, collective units, and the state excavate coal mines as they wish, and some even engage in destructive excavation. This has caused serious harm to the country's coal reserves. Some responsible

persons from coal companies admitted that there was no coal at all in some coal mines. Judging from the present situation, coal supply will fall seriously short in the next century.

Will the development of hydropower stations, including the "Three Gorges Project," help alleviate the country's power shortage? Jiang Shengjie frankly admitted that whether the "Three Gorges Project" can be carried out still remains an issue under endless dispute. At least two major problems concerning the project are difficult to solve, he said. One is the accumulation of silt resulting from the construction of the main dam, and the other is "moving 1 million people" out of the dam area. In terms of time alone, it will take at least 20 years for the power station to be completed and go into operation even if the project could start now.

Furthermore, the operation of a hydropower station is affected by the weather, as is the stability of its electricity generation. Calculations reveal that in the early part of the next century hydropower exploitation will reach its limits and would be unlikely to develop further. Therefore it is imperative to develop nuclear power generation. Jiang Shengjie said, smiling, that at a national energy work meeting early this year, many thermal power and hydropower experts pointed out that the way to solve China's power shortage is to develop nuclear power stations.

[2 Apr p 1]

[Text] Beijing, 2 Apr—The development of nuclear power stations in China has become an urgent need of society, but objectively speaking, China does not possess the necessary conditions for large-scale development of nuclear power stations because it is short of capital, qualified personnel, and advanced technology. Also, the development of nuclear power stations requires special conditions, different from those for building thermal power stations. These include project design, installations, project management, and the application of safety standards.

Jiang Shengjie said that the ongoing Guangdong Daya Bay and Zhejiang Qin Shan nuclear power stations are good sites for Chinese experts to directly absorb technology and gain experience. Because these projects are new to China, he added, they are worth building, even if the costs are high. Developing nuclear power stations is a long-term program, so its results can only be seen after the construction of subsequent nuclear power stations. For example, the new Daya Bay nuclear power station that is under consideration and on which a feasibility study is being carried out will require less investment than the first.

The problem of funding is the biggest obstacle China is encountering in the development of nuclear power stations. Although the state continues to ensure its investment in the energy industry, it is impossible to solve all the funding problems for the construction of nuclear

power stations at a time when China is practicing financial retrenchment. Jiang Shengjie believes that "barter trade" is an effective method that corresponds to China's national conditions. Jiang Shengjie said that Liaoning is now planning to import two "pressurized-water-reactor-type" nuclear power plants from the Soviet Union through "barter trade." Since this will be the first time the Soviet Union has exported nuclear power plants (with a generating capacity of two times 600,000 kilowatts), to show its solemnity an agreement will be formally signed with China during Soviet leader Gorbachev's visit in May this year.

Due to changes in the international situation, China has reduced the use of "uranium" in its military industry. This being the case, the country's uranium deposits serve as a basic condition for developing nuclear power stations. According to statistics announced by China, the country's uranium deposits are adequate for 15-million-kilowatt nuclear power stations to operate for 30 years. But as Jiang Shengjie pointed out, this does not mean that the 6-million-kilowatt nuclear power stations to be built before the year 2000, as planned by the state, are too small in number, because the nuclear industry should be developed steadily according to overall state arrangements so that society can withstand the strain.

He pointed out that China is 20 years behind advanced countries in developing nuclear power stations. If China still remains in the stage of studying nuclear power stations, he added, in 20 or 30 years time there will be a wider gap between China and these countries because by then they will have reached a higher stage. Therefore, beginning from now, the country must develop new technology and new reactors, including pressurized water reactors, fast neutron [kuai zhong zi 1816 0022 1311] reactors, and nuclear heat supply [he gong re 2702 0180 3583] reactors. Some projects are beyond China's capacity for the time being, but because it will have mastered the relevant technology it can immediately proceed with these projects when opportunities and funds present themselves. "We should do our best to master technology before, and not after, opportunities present themselves."

According to statistics compiled by the International Atomic Energy Agency, in 1987 there were 417 nuclear power stations operating in the world, and the electricity they generated accounted for 16 percent of the world's total. A forecast indicates that 480 nuclear power stations will be operating in the world next year, and the electricity they generate will account for 20 percent of the world's total.

"Thus it can be seen that developing nuclear power stations is the general trend," Jiang Shengjie pointed out, adding that China should immediately work out a complete and long-term development plan for nuclear power stations, including the development rate and scale of nuclear power stations, the prospecting and exploitation of uranium mines, the strict handling of nuclear waste, and the training of a large number of nuclear technicians. In this way China will be able to stand firm and ensure its modernization in the course of industrial development and competition.

## JAPAN

### **Nuclear Reactor Shut Down After Malfunction**

*OW1004083789 Tokyo KYODO in English  
0808 GMT 10 Apr 89*

[Text] Matsue—A nuclear power reactor was shut down due to a sudden drop in recycling pump output at the Shimane nuclear power plant in Shimane Prefecture on Monday morning, according to plant officials.

There was no radioactive discharge from the Chugoku Electric Power Co. Plant, the officials said.

Officials said technicians manually shut down the No 2 reactor, with an output capacity of 820,000 kilowatts, after discovering that there had been a sudden drop in output in one of the two units' recycling pumps.

The number of rotations declined from about 1,330 per minute to about 340 per minute, and the reactor's output dropped to about 620,000 kilowatts, plant officials said.

Officials suspect the problem was caused by some trouble with the pump's control system, not with the pump itself.

Just after starting trial operations last July, the boiling water reactor was shut down for 4 days because of an electric system problem.

The reactor started commercial operation on 10 February.

## PHILIPPINES

### **Proposal To Operate Nuclear Power Plant Rejected**

*HK1104134189 Manila Radio Veritas in Tagalog  
1300 GMT 11 Apr 89*

[Text] President Aquino has rejected a proposal to put the Bataan nuclear power plant into operation as he questioned the motives behind the proposal now that the government's case against Westinghouse has been filed in the United States. The proposal was put forth earlier by Vice President Salvador Laurel.

[Begin Aquino recording in English] The government has filed a case against Westinghouse, and, in fact, according to our lawyers, we have sufficient evidence in the matter

of, well, proving that we got a raw deal from Westinghouse. I think it is rather confusing for some people now to be saying that we should look into the possibility of using the nuclear plant, when a case is already pending in court. [end recording]

Meanwhile, a New Jersey court has resumed the hearing on the government's civil suit against the Westinghouse Corp. The primary issue is whether the awarding of the contract for the construction of the nuclear plant by former President Marcos to Westinghouse was legal or not. The Philippine Government maintains that Westinghouse paid the former president bribes to obtain the contract.

On the other hand, Westinghouse again questioned the jurisdiction of the New Jersey court to hear the case, claiming that the case should be decided by the International Arbitration Panel in Switzerland, as it concerns a matter of business disagreement.

In a related development, Senator Saguisag has expressed hope that the New Jersey court will rule in favor of the Philippines. According to him, a decision may be issued in the next 4 weeks.

Like President Aquino, Saguisag is opposed to the operation of the Bataan nuclear power plant and the withdrawal of the civil suit.

[Begin Saguisag recording in progress] ...we can win billions of dollars, so why should we say things that will jeopardize our chance to claim compensation? The entire Filipino nation will benefit from whatever we can recover. [end recording]

## VIETNAM

### **Atomic Research Institute Produces Isotopes**

*BK0804100589 Hanoi Domestic Service in Vietnamese  
1100 GMT 7 Apr 89*

[Text] The Dalat Atomic Research Institute of the Vietnam Academy of Sciences has been able to produce radioactive isotopes such as phosphorus-32, iodine-131, chromium-51, and technetium to serve the health, biological, and agricultural sectors.

Despite its small capacity, the atomic reactor has been put into use with good results, thanks to good management.

In the next 5 years, the institute will continue to study many nuclear application subjects in the service of science and production.

The Dalat Atomic Research Institute is now having difficulty seeking capital investment. The lives of its cadres and workers are still beset with countless difficulties.

## INTRABLOC AFFAIRS

**GDR Symposium on Radiation Protection Opens**  
*AU0604102489 East Berlin NEUES DEUTSCHLAND  
in German 5 Apr 89 p 2*

[Text] Dresden (ADN)—At an international symposium on radiation-protection physics, which was opened on Tuesday [5 April], scientists from the Dresden Technical University are presenting a new type of solid-state detector for monitoring radiation levels in nuclear power plants to protect the people working there. The measuring instruments consist of electrodetectors that, as small ionization chambers, measure the radiation.

Scientists from the GDR, CSSR, SFRY, Poland, USSR, and Hungary are participating in the 4-day symposium.

## CZECHOSLOVAKIA

**Paper Says Nuclear Power Plant Site Safe**  
*LD1004092689 Prague Domestic Service in Czech  
0600 GMT 10 Apr 89*

[Text] Today's RUDE PRAVO carries part of a transcript of an informal meeting between members of RUDE PRAVO's editorial staff and readers in Sobeslav on topical issues of domestic and foreign policy.

In response to the question of whether it is true that the Temelin nuclear power plant is being constructed on a geological fault, it is stated that this claim was initiated in our country by the West. It has been made, in particular, by Austrian media, referring to a source at an establishment belonging to the Czechoslovak Academy of Sciences. It is true that one of the academy's establishments surveyed and selected sites for the construction of nuclear power stations. These studies are not confidential, and, therefore, they have also been disseminated abroad. The studies' concluding reports point out that, even in the maximum intensities of any future earthquake that might extend as far as the Temelin region from epicenters in the eastern Alps, no damage could occur to standard buildings. This means that this is even less likely at nuclear power engineering buildings and facilities, which are constructed with regard for increased safety in respect to such influences, RUDE PRAVO emphasizes.

## GERMAN DEMOCRATIC REPUBLIC

**Nuclear Information Agreement With Sweden**  
*LD1404093789 East Berlin Domestic Service in  
German 1704 GMT 12 Apr 89*

[Summary] A nuclear radiation protection government agreement between the GDR and Sweden was signed on 12 April in Stockholm. The government agreement envisages mutual information in case of nuclear accidents and exchanges of data on nuclear power plants and information about measured unusual increase of radioactive fallout caused by third parties. GDR State Secretary George Sitzlack termed the agreement an important contribution to the creation of a regional radiation protection system in Europe.

## HUNGARY

**Nuclear Cooperation Agreement With CSSR Urged**  
*LD1104214589 Budapest MTI in English  
1942 GMT 11 Apr 89*

[Text] Member of the parliament for Pest County and president of the Pest County Council Laszlo Balogh has sent a letter to Laszlo Marothy, Hungarian minister of environment protection and water management, requesting information on the nuclear power station being built on Czech territory near the village of Moh, by the Hungarian border. The minister has replied that there is limited information available on the power station, but, because the provision of data falls within the competence of the national committee of atomic energy, the letter was forwarded.

In his reply, the president of the National Atomic Energy Committee, Pal Tetenyi, stated that the type of power station being built in Czechoslovakia conforms with the power station operating in Paks (central Hungary), with similar technological systems and operating parameters. Although the power station at Moh is air-cooled, the president of the Hungarian National Meteorological Institute is of the opinion that the vapours released through its cooling towers, or the radioactive materials discharged through the ventilation chimneys, will not be a health hazard. Should an accident or malfunction occur, arising hazards would also compel Hungary to take the necessary precautions. In his letter to the president of the Czechoslovak Atomic Energy Committee, Pal Tetenyi urged the signing of a nuclear cooperation and information agreement between the two countries. There is also a cooperation agreement under elaboration within the CMEA, setting down procedures to be followed in the case of a nuclear accident.

## ARGENTINA

### **CNEA Inaugurates Nuclear Reactor in Algeria**

*PY0404125489 Buenos Aires TELAM in Spanish  
0336 GMT 4 Apr 89*

[Text] Buenos Aires, 3 Apr (TELAM)—The Argentine National Commission for Nuclear Energy (CNEA) has reported that today it inaugurated an experimental nuclear reactor in the Algerian city of Dradia, 20 km from that country's capital. The reactor was designed, built, and assembled by Argentine professionals.

The 1-megavolt reactor will be used in research and will produce a small amount of radioisotopes for use in medicine and industry. The reactor will also serve to launch the Algerian autonomous nuclear development program.

The CNEA has said that the entire engineering and assembly work was done with full participation of the national industry.

In March, the reactor reached the critical point, and technicians finished final tests before operations began. CNEA Director Emma Perez Ferreira attended the inauguration ceremony.

### **Nuclear Official Returns From Algeria**

*PY0604212289 Buenos Aires TELAM in Spanish  
1918 GMT 6 Apr 89*

[Text] Upon returning from Algeria, National Commission for Atomic Energy (CNEA) President Emma Perez Ferreyra stressed that "there are good prospects for signing new contracts and for building new reactors in other countries."

She made these remarks at Ezeiza International Airport after she arrived from Algeria, where she dedicated a reactor built with Argentine technology.

Ferreyra explained that 90 percent of the reactor was designed and built in Argentina. For that purpose 60 nuclear technicians had to travel. [sentence as received]

In response to a question, she said that the Atucha nuclear plant will resume operations approximately "on 27 July."

She was also asked about the possibility of building a nuclear dump in Gastre, Chubut Province. She replied: "Only in 4 years, at the conclusion of all the preliminary hydrological and geological studies, will Argentina decide whether to build one."

When asked about the method currently used for processing nuclear waste, she said that "for the time being, those materials are among the burned fuel waste that is

taken from the plant to the storage pools, where it can be kept for years." She added that "if the country decides to process fuel, we should know very well what will be done with the waste."

### **Missile Project With Egypt Reportedly Canceled**

*PY0404212089 Buenos Aires NOTICIAS  
ARGENTINAS in Spanish 1405 GMT 4 Apr 89*

[Text] It was learned today that Israel reportedly will deliver 12 A-4Q planes to the Navy and sell other planes to the Air Force in return for Argentina's decision to end its partnership with Egypt for the development of the Condor II rocket, which has reportedly been successfully tested in Patagonia.

At the end of 1988, the development of the rocket caused the international powers on the International Missile Technology Control Committee to react because the rocket is a joint Argentine-Egyptian project that could endanger Israel.

According to the PAGINA 12 newspaper, the rocket was successfully tested on 3 March over a 504-km distance in Patagonia.

According to Defense Ministry and Air Force sources, the development of the Condor II is a peaceful project that seeks to launch a satellite into orbit and has no military objectives whatsoever.

The newspaper said today that Defense Minister Horacio Jaunarena, who is now in Israel, has reportedly promised to break the accord with Egypt in order to allow Israel to join the Condor II project.

This decision may encourage the foreign powers that are committed to the security of Israel to lift the veto that has made it impossible for Argentina to receive the 12 A-4Q planes, which are valued at \$68 million and which have stayed in Tel Aviv since the Malvinas War.

The A-4Q planes, which were bought and paid for by the Navy, were to have been assigned to the 25 de Mayo aircraft carrier, but the delivery of the planes was canceled in the wake of the conflict with Great Britain.

Another issue in the Israeli-Argentine negotiations may have to do with the Air Force's need to buy new equipment. The Air Force has been unable to replace its planes because of the veto of the foreign powers.

The reconsideration of the Condor II project may facilitate negotiations with Israel over the purchase of Dagger planes for the Air Force.

Concerning the Condor, the protest of the five powers of the Control Committee—the FRG, France, Great Britain, the United States, and Italy—which were joined by Canada and Japan, is based on the fact that the Condor can become a guided missile.

The technology for flight orientation and guidance has reportedly been provided by FRG and Italian firms.

The difference between a rocket and a missile is that a rocket cannot be guided.

**Condor II Development With Egypt To Continue**  
*PY0604134989 Buenos Aires NOTICIAS*  
*ARGENTINAS in Spanish 1951 GMT 5 Apr 89*

[Text] Argentina will continue to develop the Condor II rocket with Egypt despite the promise by the Israeli Government to lift the ban on the delivery of 12 planes that were purchased by the Argentine Navy before the Malvinas conflict.

The Israeli embargo would be lifted only if Argentina modifies its agreement with Egypt.

This information was leaked to NOTICIAS ARGENTINAS by a high-level military source, who added that the rocket is designed to place satellites in orbit and will not be used for military purposes.

According to the source, the Israeli Government has asked Argentina to stop its association with Egypt over the technical development of the Condor II.

According to a commentary by the Buenos Aires newspaper CLARIN today, some international observers maintain that Israel could use the issue as an argument "to justify a preventive military strike against Iraq."

It was learned that the Condor II project has the financial support of Iraq and is being developed using FRG and Italian technologies.

The source told our news agency this afternoon that the agreement with Egypt for the development of the Condor II rocket "is very difficult to break overnight," and that the project will therefore continue.

According to the newspaper commentary, if built, the Condor II will have a range of between 800 and 1,200 km. It will be guided by equipment that will enable it to act as "an intelligent missile" capable of selecting and discriminating between several targets, and reaching them with efficiency.

**Uranium Solvent-Extraction Plant Completed**  
*PY1104191089 Buenos Aires TELAM in Spanish*  
*1865 GMT 10 Apr 89*

[Text] The National Atomic Energy Commission (CNEA) has disclosed that its Process Development Department has completed the construction of an experimental plant for solvent-extraction of uranium.

The plant design was made possible by the technological progress made by the CNEA in studying uranium concentration and purification. This plant will also make it possible to separate elements such as copper, zinc, molybdenum, vanadium, zirconium, and hafnium.

Thanks to its technical ability, this multipurpose plant will allow laboratory scale studies by varying, within a wide range, the fluid-dynamics or the process parameters of the plant.

The CNEA explained that this plant was built almost completely with Argentine-made equipment, and that the commission was responsible for the project's engineering, construction, and assembly.

The CNEA further noted that this particular technology can open new export opportunities, which would be important not only from an economic standpoint but also from the standpoint of Argentina's international prestige.

**Alfonsin Attends Atucha Nuclear Plant Ceremony**  
*PY1304005089 Buenos Aires TELAM in Spanish*  
*2209 GMT 12 Apr 89*

[Excerpts] During a ceremony held today to install the dome of the containment chamber of the Atucha II nuclear power plant facilities, President Raul Alfonsin stressed the importance of the "large projects" being implemented in the power field. He said that "these projects will benefit our children." The Atucha II nuclear power plant is located in the city of Lima, Zarate District, in Buenos Aires Province. [passage omitted]

Atucha II, which is currently under construction, is Argentina's third nuclear plant and will become the most powerful one as soon as it begins operation. It will operate at 692 mw in the national interconnected system. It will produce 10 percent of the country's total power generation. [passage omitted]

**BRAZIL**

**'Tricks' To Gain Nuclear Technology Disclosed**  
*PY1104164889 Rio de Janeiro O GLOBO in Portuguese*  
*9 Apr 89 p 9*

[Text] In a short period of time, Brazil achieved the capability to enrich uranium to a high percentage. As recently as September 1987, President Jose Sarney announced, with undisguised pride, that the country was able to enrich uranium to 1.2 percent. According to a nuclear sector source in the United States, Brazil managed to progress rapidly, thanks to tricky maneuvers. Tricks were used to prevent the United States from blocking any stage of the development process. Had that happened, Brazil could have been delayed by a decade in acquiring the technology.

The source revealed that "it became necessary to obtain equipment, but it was impossible to obtain it from the United States, Great Britain, the FRG, or even France. The option was to seek the equipment in Sweden. It was bought in component form, to be assembled in Brazil. These components were smuggled into the country. To avoid suspicion, the import documents detailed the components as parts for another machine. Many components came in described as tractor parts."

In confirming the progress that Brazil has just made, Rex Nazareth said that the U.S. Government probably knows that Brazilian scientists have managed to get the necessary equipment.

Nazareth added, "The catch is that it has no way to prove it. I will not say a word about it, even under torture! Perhaps some day, when I write my memoirs, I will reveal just how it was done."

The great concern of the United States is that Brazil has never signed the Nuclear Nonproliferation Treaty, and it continues to be disinclined to do so. Among other things, the signing of that treaty would grant international inspectors the right to periodically oversee the country's nuclear installations. This is why a thick barrier has been erected against the transfer of technology from the United States and its great European allies to Brazil.

The exchange of highly important information is subject to severe censorship. Since 1979, when it was secretly initiated jointly with the CNEN [National Nuclear Energy Commission], the so-called Parallel Nuclear Program has achieved the production of enriched uranium in the IPEN [Nuclear and Energy Research Institute] laboratories at the Sao Paulo University. To achieve this, the Brazilian Navy resorted to several tricks to obtain the required information.

One of those tricky moves was to send technicians, physicists, and engineers on courses, and to conduct research in the nuclear area at various U.S. universities.

An unidentified source connected with the nuclear program has said: "Right now there are six or seven people, sent by the Navy, studying in the United States."

The same source added: "For us, any piece of information is essential. After all, we are alone in this race. I mean that no one is helping us with technology, and everyone is withholding it from us."

### **Submarine Reactor Development Efforts Increasing**

*PY1004182689 Rio de Janeiro O GLOBO in Portuguese 9 Apr 89 p 8*

[By Fanny Zygband, Jose Meirelles Passos, and Paulo Motta]

[Text] Brazil is increasing its efforts in the production of its first nuclear submarine. By the end of this year, the construction of a test compartment simulating the submarine propulsion module should begin in Aramar. The

manufacture of the components of the reactor—known as Renap 1—which will be completed by 1995, was begun by several Brazilian industries 3 years ago.

According to Rear Admiral Othon Pinheiro da Silva, the head of the Navy Special Projects Coordinating Office, the nuclear submarine project was born in 1978, when, dissatisfied with the Brazil-FRG nuclear program, some sectors decided to launch the Parallel Nuclear Program.

The first draft of the submarine design was made in 1983 because it was first necessary to wait until it became possible to enrich uranium in Brazil. Pinheiro da Silva explained that the main difficulty at that time was to convince the CNEN (National Nuclear Energy Commission) that a Brazilian nuclear submarine was not simply a dream but a strategic need for the country, and that it was technologically viable if funds were provided. The second obstacle was the inability of Brazilian industry to produce resistant and specific materials.

Pinheiro da Silva said: "To build a submarine involves hundreds of requirements. Unlike a reactor for a nuclear plant, a submarine nuclear reactor cannot be turned off. Therefore, its degree of reliability, safety, and working precision must be much higher than that of the Angra 1 reactor, for instance. In addition, it must be shock resistant to withstand explosions. Its installations must also be resistant to pressure many times higher than atmospheric pressure. All this must also be assembled within a compact structure. So, anyone capable of designing a submarine reactor is also capable of designing any other type of reactor."

According to Pinheiro da Silva, the Navy submarine reactor power should be 50 MW. The grade of enriched uranium to fuel this reactor has not yet been precisely determined. It depends on studies being made by the Navy in cooperation with IPEN (Nuclear and Energy Research Institute). He said that most of the reactors of the world's submarines operate on 20-percent enriched uranium. The Brazilian option should follow the same line of low-power reactors that have been adopted by France and Canada. CNEN president Rex Nazareth has said that the submarine reactor can operate on 10-percent enriched uranium, or even lower.

The grade of enriched uranium does not limit the submarine capability but determines other factors, such as the reactor's lifespan and the time it can operate on a given amount of fuel without recharging. The French reactors have an average life span of 10 years. This means that a submarine powered with this reactor could remain submerged for that long, and its operational limit is set by the crew needs.

According to Commander Paulo Alfonso da Silva of the COPESP (Navy Special Projects Coordinating Board), a nuclear submarine is strategically less vulnerable than a conventional one that needs to surface every 48 hours to recharge its batteries.



Although the nuclear submarine reactor will not be ready before 1995, all the infrastructure to test its performance is already being prepared at Aramar. By this year's end, the construction will begin of a 30-40 meter long and 8-meter diameter compartment that will reproduce the nuclear submarine propulsion module. This compartment—where the future crew will train—will be installed in a huge tank reproducing the ocean pressure and temperature conditions. In case of accident, the tank would be flooded with boron-saturated water that will suppress a possible radioactive leak.

According to Commander Paulo Alfonso da Silva, the core of the submarine reactor should contain 40 fuel elements (Angra's has 200 fuel elements). He thinks that the development of nuclear propulsion has "scientific foundations," which depend on three experimental stages: the zero-power reactor (this reactor has been operating at IPEN since November and serves as testing lab); the thermal circuit of pressurized water that cools the reactor core (this primary circuit is already operating at the IPEN); and the installations to test the secondary circuit where pressurized water turns into steam to activate the power generator (which is in the construction stage at Aramar).

#### Scientists To Try Cold Nuclear Fusion

PY0604225089 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 5 Apr 89 p 9

[By Wilson Marini]

[Text] Yesterday, a bottle with 250 milliliters of heavy water was carefully set aside at the Institute for Nuclear and Energy Research (IPEN). This was the only element missing from an experiment to be conducted by the scientists of the IPEN and of the Sao Paulo University (USP) Physics Institute. They will try to quickly repeat a cold nuclear fusion [fusao nuclear a frio] experiment in the simplified manner used by scientists Stanley Pons, of the University of Utah in the United States, and Martin Fleischmann, of Great Britain.

Heavy water ( $D_2O$ ), which contains deuterium instead of hydrogen, is the indispensable element for the repetition of the electrolysis that leads to cold nuclear fusion. IPEN physicist Spero Morato yesterday met in Rio de Janeiro with experts of the National Commission for Nuclear Energy (CNEN) to obtain the other elements required for the experiment.

According to Morato, the experts still do not know which is the most sensitive neutron-counting equipment in the country. "We are about to repeat experiments that we conducted in our school days. Now, however, they will be more sophisticated," Morato said. He believes that it will be "difficult" to conduct this experiment in Brazil, although the methods used by Pons and Fleischmann "seem simple."

Physicist Ivan Cunha Nascimento, director of the USP Physics Institute, thinks that the experiment Pons and Fleischmann have described to the press has a theoretical foundation. So far, scientific works on the experiment have not been published. They will probably be published in May. Cunha Nascimento warns, however: "We cannot create expectations about when the experiment will be repeated in Brazil."

Now that the IPEN and USP teams have the heavy water, they will create laboratory conditions for the cold nuclear fusion experiment. Creating these conditions depends on data to be supplied by scientists from at least four specialties: nuclear, solid state, condensed matter, and electrochemistry. They will need some equipment, which is available in the country and is already being requested.

When everything is ready, the researchers will need 100 hours to test the in vitro nuclear fusion technique. Cunha Nascimento is anxious to receive a complete report on the experiment, about which he heard only unofficial reports by colleagues from abroad. They again warned: "We cannot create expectations regarding when the experiment will be conducted in Brazil." IPEN physicist Claudio Rodrigues adds: "Our scientific curiosity has been aroused."

The bottle of heavy water was obtained from the IPEN strategic stock, which consists of 28 liters kept in a stainless steel container hermetically sealed to keep out light and air. The heavy water, which is 99.87 percent pure, was given to the IPEN by the International Atomic Energy Agency in the 1960's. So far, it has been used to irradiate neutrons in guinea pigs, and as a solvent for liquid crystals. The IPEN, however, cannot supply another drop of its heavy water in the future, physicist Carlos Parente warned. Parente was the scientist who sent the USP Physics Institute the 250 milliliters of heavy water to start the experiment. IPEN's remaining heavy water will be used to cool the neutrons of the IPEN reactor, which uses enriched uranium, he said.

#### Uranium Enrichment Process Perfected

PY1004140489 Rio de Janeiro O GLOBO in Portuguese 9 Apr 89 p 9

[Text] Rear Admiral Othon Pinheiro da Silva, president of the Navy's Special Projects Coordinating Board [COPESP], has said that it is now 10 years since the parallel nuclear program in Brazil was started, and we are already producing uranium enriched to 20 percent, the degree necessary to feed research reactors and to produce radioisotopes. He said that it is possible to construct nuclear-driven submarines.

The process of enriching uranium to 20 percent is still at the laboratory stage, but, beginning in January 1990, enriched uranium will be produced commercially at the

Aramar Research Center, which is run by the Navy in Ipero, Sao Paulo State. When this begins, Brazil will be one step nearer to the production of nuclear weapons.

If this were the government's objective, within a short period of time Brazil could produce the first atomic bomb in Latin America. Rear Adm Pinheiro da Silva and CNEN (National Commission for Nuclear Energy) chairman Rex Nazareth yesterday stated that Brazil does not intend to go beyond the 20-percent stage because, regardless of having mastered the technology required to enrich uranium to any degree, it has no warmongering pretensions.

Although this technological development has been kept secret in Brazil, in the United States it has already caused concern. U.S. scientists have stated that they were not surprised by this step taken by their Brazilian colleagues.

A scientist linked to the Manhattan project, which in 1945 built the first U.S. atomic bomb that was dropped on Hiroshima, has stated: "This could have happened at any moment. Now we need to know what path the government will follow because the production of nuclear weapons requires at least a 20-percent enrichment level. Although it has not been done so far, it is known that a bomb can be built using uranium with a little more than 20-percent enrichment."

According to this scientist, who asked not to be identified for fear that his remarks be interpreted as a political statement, although Brazil may not want to conduct this experiment, the fact that it has obtained 20-percent enrichment means that it has reached the threshold of technology:

"The same enrichment plant that enriches uranium to 20 percent can easily produce uranium enriched to 90 percent, which is the level used to manufacture atomic bombs. We must recall that our bomb, the one that was dropped on Hiroshima, used uranium enriched to 70 percent," the scientist said.

Rear Adm Pinheiro da Silva stated that the Brazilian Nuclear Program does not intend to enrich uranium to more than 20 percent. He admitted that the technology needed to enrich uranium to 3 percent or to 20 percent is the same as that required to obtain high-enrichment levels of more than 80 percent, which is preferred for the manufacture of nuclear weapons. The number of centrifuge machines used in the process varies (the higher the degree, the larger the number of machines needed). He said that he believes, however, that mastering that technology will be held to generate essential wealth and to guarantee the country's autonomy in the energy sector. This is also the opinion of the superintendent of IPEN [Institute for Nuclear and Energy Research] who said: "To develop a technology, either for peaceful or military purposes, is a political decision of the government and Congress. It would be nonsense to refuse to develop a

technology out of fear. It is a delicate matter, but we cannot deprive ourselves of technological development because it can also be used to produce one evil among many benefits.

Rear Adm Pinheiro da Silva explained that, moving from the laboratory scale to the pilot plant scale, while it will enable an increase in production to an intermediate stage of production, requires only an increase in the number of ultracentrifuge units employed. The number of units required for pilot plant production scales is a secret; however, Commander Paulo Alfonso da Silva, a COPESP nuclear engineer, makes an educated guess that, by the end of the year, Ipero will have eight times the present number of operational units. This number, he added, will still be far short of the thousands of ultracentrifuge units required for the mass production of enriched uranium. IPEN Superintendent Claudio Rodrigues has said that calculations by his institute, which is working jointly with the Navy in the development of the Brazilian Nuclear Program, show that, if the Aramar Experimental Center does not augment the production of 20-percent enriched uranium, the country will be in a difficult position because its nuclear fuel reserves are getting low and may not last for more than a year. The lack of production of fuel has hindered the operation of the IPEN reactor and created an obstacle for the country to become self-sufficient in the production of radioisotopes, which are important for medical diagnosis equipment.

Rodrigues said: "We have a Ferrari running on a Volkswagen engine. We are getting ready to take a big step forward. We have mastered the nuclear cycle technology, we have first-rate human resources, we have reactors and installations, and we are in the position to drive a real Ferrari."

The IPEN superintendent noted that the situation should begin to change in September, when the IPEN program will increase the power and the operational time of its IEA-R1 research reactor. Rodrigues said that up until now the reactors have been using 20-percent enriched uranium provided by the International Atomic Energy Agency nearly 20 years ago. The last shipment arrived from the FRG in 1978. A year later Brazil became the target of an international boycott because it refused to sign the Nuclear Arms Nonproliferation Treaty.

Rear Adm Pinheiro da Silva considers it "quite feasible that Brazil will begin to produce enriched uranium on an industrial scale in 1997." This will mean that Brazil should be in a position to supply the 3.4-percent enriched uranium required for the operation of Angra 1, Angra 2, and, eventually, Angra 3 reactors; to supply the research reactors; to provide fuel for the first nuclear submarine reactor (Renap 1), which should be ready by 1995; and to stock nuclear fuel for submarine reactors.

**CNEN Director Describes Miniplant Program**

*PY1104182889 Rio de Janeiro O GLOBO in Portuguese  
9 Apr 89 p 9*

[Text] Rex Nazareth Alves, the chairman of the National Commission for Nuclear Energy (CNEN), has stated that Brazil has already achieved the technology to join the ultraselective club of countries that manufacture nuclear plants for a \$50-billion market. Nazareth added that, to make this a reality, Congress needs only to make the political decision of beginning such a nuclear program.

Brazil will thus be able to immediately build nuclear miniplants capable of generating between 200 and 400 MW of electricity, sufficient to meet the demands of small cities, or for isolated industrial pilot plants. These miniplants will reportedly be identical to Angra I, of the PWR [Pressurized Water Reactor] type, except that they will be compact. The Angra I nuclear plant has a capacity of 600 MW, and the capacity of Angra II and III is 1,200 MW.

We are already capable of building nuclear miniplants, and we are already building a very small reactor that provides a few megawatts. It is called RENAP 2, and this is where our technological efforts are being applied. The RENAP 2 is a spinoff from the reactor built to propel nuclear submarines, which will also serve to generate electricity.

In addition to providing the country with an alternative power source for isolated regions and for gaining experience with which to build large nuclear plants, the nuclear miniplants will allow Brazil to have a supply of plutonium. This nuclear waste, in the case of the nuclear plants built in Angra dos Reis, is under the strict control of the International Atomic Energy Agency (IAEA), the United States, and the FRG, which are the manufacturers of reactors.

The plutonium from the future nuclear miniplants will remain in Brazil. The strategic importance comes from the fact that this plutonium can be used to build nuclear bombs, a theory categorically rejected by Nazareth. The plutonium can also be used to develop the technology needed to build fast breeder reactors.

Fast breeder reactors (refrigerated with sodium) are being developed jointly with Argentina, and this could increase the demand for plutonium by up to 50 times.

The CNEN decision to take the nuclear miniplants project to the Council for Nuclear Policy [Conselho de Political Nuclear] that will in turn submit it to Congress is based on the concept that the energy supply in Brazil must meet widely divergent energy needs.

Thus, small reactors would produce only a few megawatts of energy (to be used in small cities), up to 400 MW.

Another important factor is that a miniplant will cause less damage to the environment than, let us say, a hydroelectric dam. In Balbina we had to create a huge lake in the Amazon to generate 180 MW. We cannot cover the entire region with water. Miniplants could easily meet energy demands in the Amazon region, Nazareth stated.

He went on to say that, if a political decision is made today in favor of the miniplants, they could be operational in 8 years at the most.

**Nuclear Miniplant Project Described**

*PY1004151489 Rio de Janeiro O GLOBO in Portuguese  
9 Apr 89 p 9*

[Text] Rear Admiral Othon Pinheiro da Silva, who is chairman of the Navy Special Projects Coordinating Department and the man responsible for the Aramar Experimental Center that has been operating in the interior of Sao Paulo State for 1 year, has reported that the first Brazilian nuclear miniplant for energy generation may start operating by 1998. This miniplant will generate enough energy for a town of 100,000 people.

Rear Adm Pinheiro da Silva said that the miniplant reactor project (the Renap-2, which is based on the submarine reactor Renap-1) is already being manufactured. Like the Renap-1, it will probably be developed jointly by the Navy and the Institute for Nuclear and Energy Research (IPEN).

Pinheiro da Silva explained that the specification of the Renap-2 is already being submitted to the government. It will probably have a 60-megawatt capacity, which is 100 times smaller than the capacity of the Angra-1 reactor.

Like the reactor to be installed in the submarine, the Renap-2 will also represent an important step forward. In Pinheiro da Silva's opinion, it will lead to the construction of a nuclear plant using entirely national technology, which is one of the main goals of the Brazilian nuclear program.

Pinheiro da Silva believes that, following the example of other countries that have nuclear technology, Brazil will also start building smaller plants for energy generation.

Apart from being cheaper, these miniplants are believed to be "intrinsically more secure" because they offer a higher level of protection against nuclear accidents.

The capacity of the reactors to be installed in these plants will not surpass 400 megawatts. Pinheiro da Silva said that it is desirable to construct several such plants as a source of supplementary energy for the country.

He said that he is sure that in 30 or 40 years time nuclear energy will be the second-best choice for the generation of energy in the country.

He added that it is important to develop security techniques to prevent radioactive leaks, so that these miniplants will not represent any risk to the environment.

## BANGLADESH

### Ershad Stresses Implementation of Nuclear Project

*BK0904132789 Dhaka Overseas Service in English  
1230 GMT 9 Apr 89*

[Text] President Ershad has directed the concerned authorities to stress proper implementation of the Ruppur nuclear power station project. The president issued the directive after the presentation of the techno-economic feasibility study of the project in Dhaka today.

President Ershad described the project as vitally important to meet their growing demand of power supply in the country's western belt which is expected to be increased to 1,200 megawatt by 1995. Presently, the power generation capacity in the country's western belt stands at about 250 megawatt.

Energy Minister A.B.M. Ghulam Mustafa, while introducing the presentation, gave a brief resume on the Ruppur nuclear power station project since it was conceived in 1961 [as heard]. He said that in 1986, a high-level national committee was set up by the president with himself as its chairman to initiate a fresh move to implement the project. Vice President A.K.M. Nurul Islam, ministers, secretaries and other senior officials were present during the presentation.

## INDIA

### Nuclear Scientist Comments on Pakistan's Plans

*51500100 New Delhi PATRIOT in English  
18 Feb 89 p 5*

[Excerpt] Pune, Feb 17 (PTI)—Dr Raja Ramanna, former Chairman of the Atomic Energy Commission, has said Pakistan appeared 'keen on making the bomb'.

"Apart from its pure research value, the Tritium gas plant, which Pakistan is reportedly acquiring from West Germany, can be used to manufacture hydrogen bomb".

This observation was made here last night by Dr Ramanna, during an informal chat with newsmen.

Replying to questions, Dr Ramanna said Tritium could also be used for many interesting research works.

Dr Ramanna ridiculed reports of India smuggling in heavy water from abroad for its nuclear reactor. "There is no need to do it", he said.

On the controversy over supply of "Irish butter" to India, Dr Ramanna said it was absolutely "harmless" for human consumption and the talk of its being contaminated by radiation in the wake of Chernobyl mishap was "exaggerated".

It also amounted to a propaganda having "political overtones" aimed at discouraging nuclear power proliferation, he felt. [passage omitted]

### Concern Expressed Over Pakistani Nuclear Program

*BK1704161989 Delhi Domestic Service in English  
1530 GMT 17 Apr 89*

[Text] India has expressed concern at Pakistan's weapons-oriented nuclear program and its ongoing military buildup in its quest to achieve qualitative advantage in the region. The annual report of the Defense Ministry for 1988-89 says that the Indian Government views with concern reports about Pakistan's growing security linkages with the U.S. Central Command and also with its erstwhile CENTO [Central Treaty Organization] partners.

It points out that apart from acquiring high-technology weapon system from the United States and other Western sources, Pakistan has brought about significant upgradation of its existing weaponry in collaboration with China and other countries.

The report observes that India has been compelled to focus attention on antisubmarine defense following Pakistan's recent acquisition of 100-km-range naval missile which poses a potential threat to India's on-shore and off-shore installations.

The report however notes that the emergence of a democratically-elected government in Pakistan is another event of importance, justifying cautious optimism for improved and more enduring relationship between India and Pakistan. [passage omitted]

### Criteria for Commissioning of Narora Plant Told

*51500099 Madras THE HINDU in English  
27 Feb 89 p 7*

[Text] New Delhi, Feb 26—The Nuclear Power Corporation (NPC) hopes to obtain the clearance from the Atomic Energy Regulatory Board (AERB) soon for commissioning of the Unit-1 of the Narora Atomic Power Project (NAPP-1) by middle-March. Mr S.L. Kati, Managing Director, NPC, said here on Thursday.

The awaited clearance from the AERB for bulk addition of heavy water into the fuel assembly vessel (calandria) has now been received thus paving the way for approach to criticality of the 235 MWe Pressurized Heavy Water Reactor (PHWR). The Corporation has already made an application to the Board for attaining criticality, it was learnt.

The stipulation of the AERB is that both the primary and secondary shutdown mechanisms have to be poised before it can give clearance for reaching criticality. With

the clearance for bulk loading of heavy water, it is now only a matter of fine tuning of various subsystems before the task of "approach to criticality" can be undertaken, Mr Kati said.

One of the main causes of delay had been in the delivery of steam generators from the Bharat Heavy Electricals Ltd. (BHEL). The entire process of installation of generators takes about 30 months but by adopting a resequencing of associated operations this was brought down to 18 months and the commissioning had been targeted for Oct-Nov 88. Slippage from this targeted date was caused when the final sub-assembly testing and checking called for some corrective measures and minor modifications before clearance could be given by the Board.

**Cable-snapping:** One of these involved cable-snapping in the shut-off rods assembly in the primary shutdown mechanism. The driving mechanism which lowers the rods had to be retested and restarted. The secondary shutdown system also showed some problems with the "boron poisoning" not being completely satisfactory. This required relocating the valves which inject a penta borate solution into the calandria vessel and flood the moderator with neutron absorbing boron ions and thereby stop the fission process.

Some downgrading of the initial test volume of heavy water circulated in the calandria was also noticed. This can happen if light water circulated first gets lodged in some pockets and downgrades the heavy water circulated subsequently. At present tests for pressure leaks in the reactor containment walls are being carried out for clearance by the AERB. Fall of pressure inside the secondary containment has to be less than 0.1 percent. After clearance for this is obtained loading of heavy water will be taken up and boron content in it slowly brought down by passing through ion-exchange units to bring its levels to the start-up value when criticality can be established. "We are taking a final hard look at every thing," Mr Kati said.

The NPC expects to establish infirm power generation by June 1989 and begin commercial operation of NAPP-1 by Aug-Sep 1989. Commissioning of Unit-2 is targeted for May 1990. "We will try to advance it by a couple of months," Mr Kati said.

**Kakrapar Project:** As regards the Kakrapar Project, the next two units of 235 MWe PHWRs scheduled to come up are expected to be commissioned in 1990-91. The cost of the Kakrapar Project is, however, set for a revision and the proposal is to be approved by the cabinet. The sanctioned cost for the units had been Rs 382.52 crores in July 1981.

**"Bad year for MAPS":** For MAPS (Madras Atomic Power Station, Kalpakkam) it has been a bad year, Mr Kati admitted, given the repeated problems with its Unit-2 reactor. But the heavy water leak at Unit-1 on Friday, a day after Mr Kati made his remark, makes the

matter worse. For, till now Unit-1 of MAPS, so far the best performing of the Indian nuclear power stations, seemed to have been running well after the earlier problems with its turbine rotor had been sorted out, albeit temporarily.

The source of the Friday leak, according to an agency report, is yet to be identified and till such time that the source remains inaccessible the time to bring back the unit on line cannot be estimated. The amount of heavy water that has leaked is, however, reported to be small.

According to Mr Kati, the capacity utilization factors of power generation in the various nuclear power stations under the NPC during the year have been as follows. TAPS-1 = 84.83 percent, TAPS-2 = 62.82%, RAPS-2 = 81.2 percent (if power supply to the heavy water unit is also taken into account). MAPS-1 = 68.13 percent and RAPS-2 = 34.76 percent. The capacity factor for RAPS-1, which does not provide commercial power generation after cracks developed in the end-shield of its calandria and is, therefore, not operated by the NPC, is 24.48 percent against its non-downgraded rating. If it is evaluated against a downrated 100 MWe capacity the factor would be over 50 percent.

Commenting on the Soviet VVER 1000 MWe reactors, Mr Kati said that currently both Indian and Soviet experts were engaged in preparation of the Detailed Project Report (DPR) which would go into the various design, safety and cost aspects of the project.

### Feasibility of Uranium Recovery To Be Studied

#### Work at Bhabha Center

51500102 Bombay THE TIMES OF INDIA in English  
1 Mar 89 p 9

[Text] Cochin, February 28—The Bhabha Atomic Research Center, Bombay, has undertaken a feasibility study on recovering uranium from phosphoric acid, in collaboration with the Fertilizer and Chemicals Travancore Limited (FACT) here.

The Indian Rare Earths Limited (IRE) chairman and managing director, Mr R.K. Garg, said here recently that the laboratory-scale process development work for this was being done in BARC.

The process would be introduced in all fertilizer plants in the country if found successful, he said.

Mr Garg said IRE had launched a diversification and expansion programme, pushing up the expected sales turnover to Rs 75 crores in 1989-90 from Rs 55 crores last year. It was estimated at Rs 125 crores in 1990-91, he said.

### **Indian Rare Earths Plans**

51500102 Bombay *THE TIMES OF INDIA* in English  
23 Feb 89 p 17

[Text] Indian Rare Earths proposes to set up a full-scale uranium extraction plant in collaboration with the Fertilizers and Chemicals, Travancore (FACT) at Eloor near Cochin.

Mr R.K. Garg, chairman and managing director, of IRE has said the idea was to extract uranium from phosphoric acid, being produced at FACT.

Feasibility studies are on and a project report will soon be ready, he said, adding that 15 to 20 tonnes of uranium was expected to be produced from the plant. IRE has also planned to set up similar units attached to other major fertilizer plants in the country, he said.

A Rs 3 crore-plant, which is under construction at the Eloor plant, for extraction of elements like Samarium (used for making magnets), yttrium (used in ceramics and super-conductors), europium (used for TV components) and cerium (for polishing glasses), would go on stream in three months.

Meanwhile a Rs 17 crore expansion project, to produce ilmenite, rutile, zircon, monosite, garnet and some elements from beach sands, at IRE's Chavara plant near Quilon is expected to be commissioned by next year.

### **Scientists To Verify Nuclear Fusion Process**

BK1604091189 Delhi *Domestic Service* in English  
0830 GMT 16 Apr 89

[Text] Scientists at the Bhabha Atomic Research Center, Bombay, have begun experiments to independently verify the startling American discovery of nuclear fusion in a jar. The director of the center, Dr Iyengar, said a group of scientists set up the fusion experiment and the results will be known in a month.

### **Budget Provides More Funding for Atomic Energy**

51500103 Madras *THE HINDU* in English  
3 Mar 89 p 11

[Excerpt] New Delhi, March 2—While there has been a cut in the plan outlay for the Department of Space (DoS), there is an increase of Rs 282 crores (34 per cent) in the outlay for the Department of Atomic Energy (DAE) in the Budget proposals for 1989-90. The Department of Science and Technology (DST) and the Department of Science and Industrial Research (DSIR) have received marginal increases.

The major chunk of rise in the outlay for the DAE, however, does not come from the budget support but from the Internal and Extra-Budgetary Resources (IEBR). While the Budget support for the atomic energy research and power schemes is Rs 600 crores (Rs 360 crores + Rs 240 crores respectively), the IEBR is RS 515

crores of which Rs 485 crores is for the Nuclear Power Corporation of India Ltd. (NPCIL). The total Plan outlay for nuclear power schemes is RS 725 crores as against Rs 478 crores last year. Under the nuclear power projects there is an allocation of Rs 33 crores for the Prototype Fast Breeder Reactor (PFBR).

Allocation for BARC up: For atomic energy research, the outlay for the head "other programmes" (No 4861) gets a major upward revision by about Rs 77 crores. Explanation for what these programmes are has not, however, been provided. The head 4861 normally includes capital projects and some aspects of the heavy water programmes. The BARC gets an increased allocation of Rs 170.52 crores (up by about Rs 30 crores) and the rise is due to an allocation (plan + non-plan) of Rs 46.71 crores for the fuel reprocessing plant (PREFRE) at Kalpakkam. There is also a 50 per cent rise in the allocation for the Centre for Advanced Technology (CAT) at Indore which gets Rs 12 crores.

There is also Rs 36 crore rise for the projects of the Nuclear Fuel Complex (NFC). As much as Rs 43 crores has been provided for the expansion of the fuel and tube fabrication facilities, part of which will go towards the proposed uranium-oxide plant of 50 MT capacity. The total cost of this plant is expected to be about RS 180 crores. Activity on the new zircalloy fabrication plant at an estimated cost of Rs 250 crores will also start this year for which Rs 1.4 crores has been allocated. [passage omitted]

## **IRAN**

### **Majlis Speaker Visits Missile Research Center**

LD0604180689 Tehran *Domestic Service* in Persian  
1630 GMT 6 Apr 89

[Text] Mr Hashemi-Rafsanjani, the acting commander in chief, visited the Engineering Research Center of the Construction Jihad this afternoon. During his visit the acting commander in chief inspected different areas of the center, including those dealing with armored vehicles and equipment; laboratories; expert groups [as heard] mechanics, and the metallurgy, electronics, and (?polymedtric) industries. He was also briefed on medium-range missile production projects, as well as on models of projects for the Construction Jihad's research centers in Esfahan, East Azarbayjan, Fars, and Khorasan Provinces.

At the end of his visit, the acting commander in chief gave an interview to our correspondent, as follows:

[Begin recording] [Unidentified correspondent] Mr Hashemi-Rafsanjani, you have just visited the Engineering Research Center of the Construction Jihad. Please tell us how you assessed the efforts of these dear ones toward attaining independence, self-sufficiency, and a strengthened defense capability?

[Hashemi-Rafsanjani] In the name of God, the merciful, the compassionate. There is great work being done here. Part of it is related to defense affairs. As far as I have seen, their work was very good. I was most interested in the progress they have achieved in missile production. Some have already been tested, which I saw. I also saw those who have not yet been tested. I believe it is a powerful center for meeting the various needs of the country; they are doing research toward that end. They manufacture models. It inspires hope, but it is not possible to talk more on these affairs. [end recording]

**Nuclear Weapons Program Reportedly Started**  
*NC2104140789 Cairo MENA in English*  
1340 GMT 21 Apr 89

[Text] Kuwait, April 21 (MENA)—Iran has started implementation of a nuclear programme aimed at producing the fuel required for the production of atomic weapons, according to Kuwaiti newspaper "AL-QA-BAS" today.

Quoting diplomatic sources in Japan, the newspaper said that Iran purchased from Japanese markets during 1987 a large quantity of materials needed for the production of atomic weapons. It added that Iran was also seeking nuclear technology and expertise while trying to keep its programme in secrecy.

**IRAQ**

**IAEA Official Confirms Peaceful Nuclear Usage**  
*JN0604141989 Baghdad INA in English*  
1330 GMT 6 Apr 89

[Text] Vienna, 6 Apr, INA—General director of the International Atomic Energy Agency (IAEA) has confirmed that "there is nothing which can refer to nuclear material which might be transferred to Iraq for non-peaceful uses".

"Iraqi nuclear installations are under IAEA observation and IAEA experts are inspecting them continuously and there is nothing which can refer during the processes of IAEA monitoring which can show that nuclear material was transferred to be used for non-peaceful purposes", the IAEA official told INA correspondent here today.

Answering a question on "Israel's" threats to launch aggression against Iraqi scientific and industrial installations, the IAEA official stated that most of the countries in the region, including Iraq, are signatories of a treaty for nuclear weapons non-proliferation in addition to Saudi Arabia which had joined the treaty, except "Israel" which had not signed the treaty.

The IAEA director general added that "the latest general conference had discussed the question of observation in the Middle East and the General Secretariat was examining ways to implement observing measures (guarantees) in this area," pointing to the possibility to free the area from nuclear weapons.

Iraq yesterday strongly warned that it would fiercely reply to any "Israeli" aggression on Iraqi industrial and scientific installations, in a statement on reports and fabricated statements recently aired by Zionist circles on claims that Iraq had produced nuclear [war]heads.

**ISRAEL**

**U.S. No Longer Able To Ignore Nuclear Status**  
*TA0604132989 Tel Aviv HADASHOT in Hebrew*  
6 Apr 89 p 2

[Commentary by military correspondent Alex Fishman: "The United States Stops Turning a Blind Eye"]

[Text] If the report in the London paper THE INDEPENDENT is true, that the Americans have decided to prohibit Israeli scientists from entering their nuclear installations, it is a poignant and clear signal that the nuclear status the state of Israel had enjoyed with the Americans has changed. Somebody in the new administration decided to do something about the matter.

Israel had for years enjoyed the status of a so-called threshold country in the nuclear sense, that is, a country enjoying the benefit of the doubt. This definition applies also to South Africa, India, and Pakistan. As long as there was a great deal of doubt and as long as Israel kept a very low profile in terms of information about what was going on, everybody opted to turn a blind eye. A year ago, when asked to comment on reports about Israel's nuclear capability, a senior U.S. official said: "We know nothing, and it is good that we do not." What was written on the Vanunu affair sowed great confusion in the world, and a long time elapsed before its full meaning was grasped. Confirmation by the superpowers that Israel has nuclear weapons would have forced them to do something, and that is why they chose to ignore the matter. Replying to a question about nuclear capabilities a few months ago, Soviet Foreign Ministry spokesman Gennadiy Gerasimov said he knew nothing about it.

The Soviet attitude took a 180-degree turn in February. During his visit to Cairo, Foreign Minister Eduard Shevardnadze talked firmly and at length about Israel's acquisition of nuclear arms. A month earlier he raised the issue at the Paris conference on a chemical weapons disarmament charter. The Arabs mentioned their signing of the charter in the same breath with Israel's nuclear weapons. The issue received front-page coverage and evinced various reactions, including that of the Soviets.

The Americans are very worried about nonconventional weapons in the Middle East. The issue recently gained momentum, partly because of the Israeli public relations offensive against the chemical weapons owned by Syria and Libya and because of the erosion in Israel's status as a threshold country. The doubt, at least as the Americans see it, is gradually vanishing. In the past few months, there have been various reports in the U.S. press attributed to State Department officials dealing with the nuclear issue in Israel. A book by the researcher Leonard Spector on nuclear propagation unequivocally states that Israel has nuclear weapons. The book actually is an annual report and is very respected and accepted by the administration. Administration officials are quoted in the report as saying that Israel has some 60 nuclear warheads. In the past, reports estimated the number of warheads at 200.

Administration officials apparently can no longer argue that they know nothing. The reaction to the change in Israel's status could have come 6 months ago or 1 year hence. What is clear is that the Bush administration is less committed to the intimate relationship that enabled it to turn a blind eye. The United States is today signaling that the game cannot go on. The Americans have always wanted Israel to be under control—today more than ever.

**Reported U.S. Ban on Scientists Termed Rubbish**  
*TA0604075489 Tel Aviv IDF Radio in Hebrew*  
*0600 GMT 6 Apr 89*

[Excerpts] The British daily THE INDEPENDENT disclosed yesterday that the United States has decided to ban Israeli scientists from entering highly restricted nuclear weapons laboratories, after it appeared that they had access to classified information dealing with nuclear weapons. [passage omitted]

Arye Shomer, the director general of the Ministry of Science and Development, said in reaction to THE INDEPENDENT report that Israel has not received any report on such a U.S. decision. The report is pure rubbish, Shomer said.

**Commentator on Possible Bombing of Iraqi Reactor**  
*TA0204130589 Tel Aviv YEDI'OT AHARONOT in Hebrew*  
*2 Apr 89 p 18*

[Commentary by 'Uzi Mahanaymi: "This Time It Is Going To Be Hard To Bomb There"]

[Text] The Israeli air force attack on the Iraqi nuclear reactor in June of 1981 and the disclosure of "Israel's nuclear capability" in 1986 by Mordekhay Vanunu have accelerated the Arab race for strategic weapons. Syria, Iraq, Egypt, and Libya are all making special efforts to equip themselves with nuclear arms (Iraq), and chemical-biological weapons (Syria, Egypt, and Libya.) At the

same time, they procure and develop long-range missiles by means of which their nonconventional warheads are effectively transposed hundreds of kilometers closer to the target.

Iraq never gave up its intention to produce nuclear weapons. Only last week the Iraqi ruler revealed that Saudi Arabia is financing the renovation of the power plant. The Syrians have devised an advanced network of chemical and biological warheads that could be mounted on their long-range surface-to-surface missiles. The Egyptians are developing their Condor-2 missile, which, once completed, could be equipped with a conventional or other warhead and be aimed at nearly any target in the Middle East. The Libyans are not far behind.

It is no secret that the presence of nonconventional weapons in Arab countries has aroused grave concern among top Israeli defense echelons. Defense Minister Rabin has already expressed these sentiments several times in the past. There may also be a great deal of truth in the arguments of U.S. specialists who contend that Israel will have to learn to live with the new regional strategic reality.

An attack on an Iraqi nuclear reactor currently seems a tough mission, albeit not an impossible one. Iraqi retaliation for such an attack seems quite realistic today, as Iraq has stated rather clearly and openly. Strategic weapons will not decide the next war. Their presence in some Arab countries compels Israel to realign itself properly insofar as its military readiness is concerned, particularly after a close review of the various peace offers.

**Heavy Water Pact With Norway 'Scrapped'**  
*TA0404093889 Jerusalem THE JERUSALEM POST in English*  
*4 Apr 89 p 1*

[Article by diplomatic correspondent Menahem Shalev]

[Text] The Israeli-Norwegian agreement on heavy water, initialled last summer after months of tough negotiations, was effectively scrapped yesterday as Jerusalem agreed to reopen talks on Norwegian inspection rights.

Foreign Minister Moshe Arens said Israel and Norway had agreed that experts would examine the "degree of consistency" between the June 1988 accord and the original 1959 agreement by which Norway sold Israel 20 tons of heavy water.

But Norwegian Foreign Minister Thorvald Stoltenberg told THE JERUSALEM POST that the June 1988 agreement "was unsatisfactory. It is a non-starter."

Officials of both foreign ministries will launch the renewed talks in the near future, sources here said. Israel's team is expected to be headed by Foreign Ministry assistant director-general Eytan Bentzur.



Norwegian parliamentarians have contended that Israel used the heavy water to manufacture nuclear weapons. Last summer's initialled agreement permitted Norway to inspect the nine tons of water Israel claims remains of the original 21 and "envisaged" negotiations on eventual inspection by the International Atomic Energy Agency (IAEA).

Israel objects to Norway's present demands that the inspection take place inside the nuclear facilities in Dimona; that it cover the use of the water in the past and not only in the future; and that Jerusalem's commitment to IAEA inspection be more binding and more comprehensive.

It is understood that the IAEA refuses to accept "piecemeal" inspection rights, and will agree to participate in inspections only if all nuclear facilities in a country are opened to it.

#### **FRG Defense Minister Discusses Proliferation During Visit**

##### **On Anxiety Over Missile**

*LD1104142389 Hamburg DPA in German  
1334 GMT 11 Apr 89*

[Text] Jerusalem (DPA)—Federal Defense Minister Rupert Scholz has strongly condemned the presumed involvement of German firms in armament projects in the Middle East and has expressed "full understanding" of the anxiety of the Israeli Government over this development. In a conversation with the German press agency DPA, the minister said today in Jerusalem, "There is a real danger here, and if people are worried in Israel that Western countries or corresponding firms are involved in the production of such weapons, then I have expressed understanding here, in the name of the federal government."

On Israeli reports of the involvement of Messerschmitt Boelkow-Blohm in the development of the medium-range Condor II missile in Egypt, Iraq, and Argentina, Scholz said: "We do not yet have enough information to be able to make a conclusive assessment. Nevertheless, this development shows that we must tackle events of this kind with every rigourousness and firmness." Scholz, who met Foreign Minister Moshe Arens and Finance Minister Shimon Peres today in Jerusalem, stressed that he "outlined to Arens that the federal government is fully resolved to see that nothing terrible happens here."

Scholz did, however, stress Israel's military superiority over its Arab neighbors. However, he admitted: "If the danger of war is stirred up with such chemical, biological, and nuclear weapons, then this creates a dimension against which one is easily defenseless, and which has terrible consequences. Therefore, Israel's anxiety here has to be taken very seriously." Every person who "is active in this way abroad is doing something not only morally irresponsible but also illegal," Scholz warned.

##### **Arens Asks About Missile**

*LD1104153989 Hamburg DPA in German  
1502 GMT 11 Apr 89*

[Excerpt] Jerusalem (DPA)—Israeli Foreign Minister Moshe Arens has asked Federal Minister of Defense Rupert Scholz for clarification on the involvement of FRG firms in arms projects in the Middle East. After talks with his Bonn guest, Arens said today in Jerusalem that he had "asked about the participation of West German firms in some arms projects in Middle Eastern Arab states that are in a state of war with us."

Arens was reacting to press reports according to which the FRG enterprise Messerschmitt-Boelkow-Blohm (MBB) sold plans for the construction of the medium-range missile Condor 2 to Egypt, Iraq, and Argentina. [passage omitted]

##### **Arens Expresses Concern**

*TA1104162989 Jerusalem Domestic Service in Hebrew  
1500 GMT 11 Apr 89*

[Text] Foreign Minister Moshe Arens today met the West German Defense Minister Rupert Scholz and expressed Israel's grave concern regarding the involvement of citizens and companies abroad—including in Germany—in developing the offensive capabilities of the countries in confrontation with Israel. The visiting minister said that his country still lacks information regarding Iraq's nuclear development plan, a plan in which, according to media reports, West German, Argentine, and Egyptian companies are involved. He promised, at the same time, that his country will act toward preventing the participation of German companies in such projects, either through legislation or stricter implementation of existing laws.

##### **Maltese Radio Reports 'New' Israeli Reactor**

*NC1204212089*

[Editorial Report] Valletta Voice of the Mediterranean in Arabic at 1530 GMT on 12 April, as part of its news headlines, carries, among others, the following:

"In the past 2 years, and in addition to the Dimona nuclear reactor, the occupation authorities in Arab Palestine have built a new nuclear reactor with the help of France, Canada, and the United States.

"The head of U.S. intelligence says that the strategic balance might collapse after Libya receives advanced planes capable of reaching southern Europe and occupied Palestine."

Voice of the Mediterranean carried only news headlines during its news program, and there is no elaboration or further reportage.

## PAKISTAN

### Daily Notes Success in Missile, Rocket Production

*BK0304074789 Lahore JANG in Urdu 21 Mar 89 p 1*

[Text] Islamabad (by special correspondent)—Pakistan has manufactured a surface-to-air missile [SAM] that is capable of destroying enemy aircraft and surveillance planes flying up to an altitude of 8 kms. This is yet another achievement by [Pakistani scientist] Dr Abdul Qadeer Khan and his colleagues. The success achieved jointly by Pakistan's Ministry of Defense production and scientific and nuclear research organizations has made Pakistan's air defense considerably more impregnable. These missiles will be displayed during the 23 March Pakistan Day parade at the Race Course Grounds in Rawalpindi. Hatf, the surface-to-surface missile capable of hitting the target up to a range of 300 km, will also be displayed during the parade.

It has been learned that Pakistan's national organization of space research, SUPARCO [Space and Upper Atmosphere Research Commission], has almost completed the arrangements for testing a new rocket booster. The success of such a test will enable Pakistan to launch its own communications satellite into orbit. SUPARCO is expected to test-fire the rocket [booster] by August or September. This booster can deliver a rocket up to a distance of 400 miles. The test will constitute the first of a 3-phase program for launching indigenously-designed and built lightweight satellites into the orbit. The production of rocket boosters for all three phases are in different stages of completion.

SUPARCO has also achieved the capability to manufacture various types of rockets, and their hardware, software, and relevant parts are all built indigenously by Pakistan. Special computers have been installed for design work, and micro- and mini-computers have been linked to the mainframe computer to deal with detailed statics. Moreover, SUPARCO scientists are engaged in

producing propellant fuel to provide power to the satellite rocket booster. It has also been learned that Pakistan has carried out four successful tests of its first satellite Badr-A. Badr-A is more sensitive and modern than any other satellite in the world.

A report by Pakistan TV says Pakistan has developed a multistage rocket capable of delivering scientific equipment to a very high altitude. This was stated by SUPARCO Chairman Salim Mahmud while talking to the television reporter. Dr Salim Mahmud said that SUPARCO has been launching various programs and all of them are progressing very well. He said that there has been considerable progress in rocket manufacturing, and tests in this regard have been carried out since the beginning of this year, 1 January 1989, adding that a big rocket booster will also be test-fired in the current year. Dr Mahmud said that all these tests are aimed at delivering various equipment to the highest possible altitude, and sending light satellites into near-earth orbit. He said that the people will hear more information in this regard in the coming months, and there will be more progress.

### Gandhi Says Pakistan Close To Making Nuclear Bomb

*BK0604162089 Delhi Domestic Service in English 1530 GMT 6 Apr 89*

[Text] The prime minister has reiterated that Pakistan is close to making a nuclear bomb and its nuclear program is military in nature. Mr Rajiv Gandhi was speaking at a question-answer session with the students of Vishwa Bharati University in Shantiniketan today. Replying to a question, the prime minister said that both India and Pakistan are trying to improve their relations. Chances have brightened with Ms Benazir Bhutto taking over as prime minister of that country. Mr Gandhi, however, admitted that there are some basic problems in the way of normalization of Indo-Pakistani relations.

The prime minister arrived in Shantiniketan this afternoon to attend the convocation of Vishwa Bharati tomorrow. He was received at the helipad by the West Bengal governor, Mr T.V. Rajeshwar, and the state minister of education, Mr Kanti Biswas. The PCC [Pradesh Congress Committee]-I chief, Mr A.B.A. Ghani Khan Chowdhury, was also present.

### **Construction of Krasnodarskaya Atomic Plant Halted**

18220075 Moscow SOTSIALISTICHESKAYA  
INDUSTRIYA in Russian 28 Mar 89 p 1

[Article by V. Zhilyakov (Krasnodar): "AES Construction Halted"]

[Text] The last worker left the construction site of the Krasnodarskaya Atomic Electric Power Station [AES] yesterday. This facility no longer exists. The village for 700 residents and the large industrial base constructed for it have been turned over to local enterprises.

Almost a year ago the bureau of the USSR Council of Ministers for the fuel and energy complex made a decision to halt the construction of the AES in Krasnodar Kray. Protests from the public and party and Soviet agencies played no small role in this. It was intended to construct the station in the foothills of the Northern Caucasus, where, as additional research showed, earthquakes are possible. But the seismicity of the chosen zone and the inadequate development of the entire complex of problems during planning did not stop the Ministry. While the Kuban residents beat a path to the doors of the higher authorities, the builders managed to spend more than 20 million rubles on the construction of the AES. With this money it would have been possible to build more than 10 modern multistory residential buildings....

But it is too soon to call this story closed. The problem of the shortage of electric energy in the kray is as critical as before.

It is assumed that along with the AES there would be a thermal electric power station, but no final decision has yet been made. During the period of the public outcry against the construction of the AES, scientists and specialists made interesting suggestions concerning the organization of energy engineering in the Kuban. Attention should also be paid to them. For example, on the territory of the kray there is a multitude of rapidly flowing mountain rivers. Docent of Kuban State University Yu. Yefremov suggests resurrecting past traditions of small hydroelectric power stations. At one time in the Caucasus it was planned to construct entire cascades of small and mini-GES's [hydroelectric power stations]—on the waterfalls of rivers, alpine lakes with their rock dams, and water reservoirs in ravines between the mountains. But the proponents of megalomania won out.

No less interesting are the proposals of the initiators of the nontraditional energy engineering that is based on inexhaustible natural resources.

But, in order to carry this out, it is necessary to have assistance from the Ministry of Power and Electrification and decisive actions on the part of the kray leadership. But so far one gets the impression that, having halted the construction of the AES, the leadership and the public in the kray consider the matter ended.

### **Chernobyl Area Measures, Radiation Levels Reported**

LD0904203289

[Editorial Report] Moscow Television Service in Russian at 1928 GMT on 7 April in its "View" program carries a report on the Chernobyl nuclear electric power station [AES]. The video shows Vladimir Politykovskiy, reporting from the area, say that the "View" program has been given permission to film inside the "sarcophagus" of the nuclear station. Inside the nuclear power station building, Politykovskiy talks with I.N. Kamulov, chief of the comprehensive expedition under the Atomic Energy Institute. Both men are wearing overalls and have face masks around their necks.

Kambulov describes the scene, saying, "This is the block control board number four, where all this actually started—that is, from the controls of this board the reactor was brought to the state that you have seen. During 1988 our work and the research carried out here clearly give grounds for stating that this installation is safe in nuclear terms. There are a great many rumors and radiation phobia." He continues: "The important thing is that the information that comes from here should be trustworthy, but we are working to ensure that safety is guaranteed. As yet, we have no figures whatsoever. We keep a very close eye on emissions and on the state of the building. As yet we have no grounds whatsoever for stating that there are emissions of enhanced danger connected with the state of the installation, the shelter." Video shows a digital radiation meter reading: 566.4. A voice says "normal."

The film then cuts to "News Conference on Ecology—Ukrainian Ministry of Health," identified by screen caption. A number of officials are shown seated before assembled journalists. Against the background noise an exchange takes place between Politykovskiy and an official. The official says that a special news conference has been held on Chernobyl. Politykovskiy asks about the number of children of preschool age living in the 30-km zone. The official replies that there are over 1,100 people, according to recent figures. He insists these are adults, not children. An unidentified woman says that in the summer of 1988 the number of children in the zone reached 401, but that only eight were counted on a January visit.

An interview then follows between Politykovskiy and M.P. Umanets, director of the Chernobyl AES. Politykovskiy asks, "What about your situation here now? Do you often have to—are you forced to tell untruths? I always say what I think, first of all. I believe in what I

say. Politkovskiy then asks, "You came from the Lenin-grad station, correct?" Umanets replies in the affirmative. Politkovskiy says, "I know that there was an accident there, too, but it was kept secret at that time, that is, the aftermath of the accident, and how it happened. There is a view that, if there had not been such secrecy about this accident, there would not have been an accident 3 years ago in Chernobyl." Umanets then states, "The people of Chernobyl know about the reasons and the results of this accident."

Politkovskiy later asks Umanets what he believes will happen in the Chernobyl area, to which Umanets replies, "There can probably be no question, in my view, of people living here normally in the very near future, or at least in my lifetime. That is clear-cut. It is impossible, that is, to return women and children here and set up kindergartens and live a normal life. One can already say new-generation reactors are being designed in our country today. They are more reliable in their fundamental approaches."

Video next shows Politkovskiy in the countryside; the screen caption reads: 30-km zone. A man in an army uniform is shown taking a radiation reading over 100 breakdowns ("sto raspedov"); he reports that the level here is twice that set for those living here temporarily, and says there are no people living permanently in the 30-km zone.

The army officer is shown taking another reading, saying that pollution levels are 10-15 times higher than the permitted norms. He notes that this will give rise to illnesses of various degrees, cancer, and radiation sickness.

The film cuts to Pripyat, where I.I. Fedotov, chief engineer of the "Kompleks" enterprise, shows the difference in tree seedlings that have been exposed to radiation and control seedlings next to them. The report returns to the interview with Umanets. Umanets and Politkovskiy discuss radiation levels. Umanets says, "There is no ban in our country on every person knowing his radiation dose. There is simply a shortage of good radiation dosimeters in industry today; this is an absolute fact."

The film cuts to shots of a sand bank with a nuclear warning sign. M.P. Telyatnikov, identified by screen caption as lieutenant colonel of the internal service and USSR Hero, talks about those affected by radiation sickness and about victims' rights in seeking damages in the courts for their suffering.

After a brief clip of people watching a film at the Chernobyl "Stalker" Youth Center, there is another interview. Yu.N. Shcherbak, writer, USSR people's deputy, says: "There is still a very great deal that we do not

know about. We do not know who gave the command for information to be suppressed. We do not know all these secret mechanisms, and who is responsible. We do not know who decided, nonetheless, to hold the 1 May parade in Kiev. This has been hidden hitherto in safes. There are definitely people who know this. They have still not told the truth. I think that in the future we shall have to return to this topic more than once. If, for example, the set is shut down, for some elementary technical reason—the shutting down of a set occurs more frequently now—catastrophic rumors spread that something has happened there. I cannot understand why a station 100 km from Kiev cannot report that the first set has been shut down for routine maintenance. This is an elementary matter. This is not said; this is not reported. There have been all sorts of rumors in connection with the sarcophagus. You have been there, and you know that there is a crack in the building there. But let us say openly that this does not mean that it will collapse tomorrow. But it means that we have to have some sort of concept of what we should be doing with the sarcophagus and the building of the fourth set. Rumors are emerging from here." He goes on to say that he thinks the Chernobyl anniversary date should be more solemnly marked.

The film moves to the 10-km zone, burial ground, which is identified by screen caption. An interview follows there with V.M. Starodumov, director of the specialized decontamination enterprise Kompleks, about the scientific value of this zone.

The video then returns to the studio, where Politkovskiy says the Ministry of Health's interdepartmental council allowed him to see a copy of a Ministry of Health letter, numbered U-261-7-S, dated 27 June 1986, which discusses strengthening secrecy procedures in fulfilling work on eliminating the effects of the Chernobyl accident. He says, "Point 4: Classify as secret information on the sickness rate. Point 8: Classify as secret information about the results of treatment. Point 9: Classify as secret information about the degree of the radiation injuries among the staff that took part in eliminating the aftermath of the accident. People want to know, you see, they want to know. There are a number of governmental decisions from the Council of Ministers about benefits. It turns out that here in the country of shortages, I mean both medicine here and the benefits themselves, in the country of shortages, benefits are a secret." Two studio guests, Ernest Anitistov, a doctor of law, and Konstantin Raykin, give their reaction to the Chernobyl feature and deplore the fact that people are so ill-informed about the dangers of radiation. Anitistov calls on the local authorities to intervene and protect the health of children in particular. Finally, Politkovskiy says he intends to return to the area because it is his duty as a journalist, and he hopes for changes for the better soon.

## Trade Unions, IAEA Meet To Discuss Nuclear Energy Safety

### USSR's Shalayev Speaks

18070606a Moscow TRUD in Russian 8 Apr 89 p 3

[TASS item: "Cooperation with the IAEA"]

[Text] Vienna, 7 April—A broad circle of problems connected with strengthening international cooperation in the cause of developing nuclear energy and with the role of trade unions in assuring the reliable working of atomic power stations is the center of attention at a consultative meeting of representatives of the International Atomic Energy Agency [IAEA] and several trade union organizations, which has opened here.

Speaking at the opening of the meeting, IAEA Director General Hans Blix noted that nuclear energy, which occupies an important place in the overall world energy balance, is widely used in industry, agriculture, and medicine. At present about 430 atomic power stations are operating in 26 countries of the world, producing about 16 percent of all energy produced in the world.

S. A. Shalayev, chairman of the All-Union Central Trade Unions Council [AUCTUC], said in his speech that Soviet trade unions consider that atomic energy plays a large role in accelerating the economic and social development of the country.

The tragic lesson of Chernobyl, he noted further, shows that the entire concept of the safety of nuclear reactors must be reconsidered in general. The disaster agitated public opinion. The lesson of Chernobyl is not that we should reject nuclear energy, but that we should concentrate attention on lessening the risk involved in operating atomic power stations. Their safe operation is possible and demands that a whole complex of measures of continual and strict oversight of the state of affairs in nuclear energy be taken, including oversight by social organizations.

### Joint Document Presented

18070606b Moscow TRUD in Russian 9 Apr 89 p 3

[TASS item: "In the Center of Attention of the Meeting—Nuclear Energy"]

[Text] Vienna, 8 April—The necessity of strengthening the international regime of the safe development of nuclear energy and of the wide involvement of trade unions in the processes of adopting decisions in this area was emphasized at a consultative meeting of IAEA representatives and trade union organizations.

Trade union delegations from 18 countries with a developed nuclear energy industry, and also several international trade union federations, participated. AUCTUC Chairman S.A. Shalayev headed the Soviet delegation.

Over the course of two days in IAEA headquarters an interesting exchange of opinions took place on the future of nuclear energy and on ways to increase the reliability of operation of atomic power stations. Trade union officials noted that for the foreseeable future, taking into account economic and ecological factors, peaceful atomic energy will be one of the basic sources of satisfying the growing demand for electrical energy.

It was emphasized at the meeting that assuring its safety is the key question in the further development of nuclear energy. This problem is in essence international and it demands the widening of cooperation and the active involvement of social organizations, including trade unions, in this process.

In a joint document presented by the trade union organizations, the necessity of guaranteeing the participation of trade unions in developing and carrying out a broad complex of measures to assure the safe operation of atomic power stations is emphasized in particular. The IAEA in its activities should devote more attention to questions of safety in nuclear energy. The trade union representatives stated that it is also important to step up the carrying out of independent international inspections of atomic power stations without advance notification of governments.

## EUROPEAN AFFAIRS

### Text of EC, Japan Accord on Nuclear Fusion Research

36980139 Luxembourg OFFICIAL JOURNAL OF  
THE EUROPEAN COMMUNITIES in English  
Vol 32, No L57, 28 Feb 89 pp 62-76

[Text]

## COMMISSION

### COMMISSION DECISION

of 10 February 1989

concerning the conclusion of an Agreement for cooperation between the European Atomic Energy Community and the Government of Japan in the field of controlled thermonuclear fusion, by the Commission for and on behalf of the Community

(89/149/EURATOM)

THE COMMISSION OF THE EUROPEAN COMMUNITIES,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular the second paragraph of Article 101 thereof,

Whereas the Council, in its Decision of 23 January 1989 approved the conclusion of the Agreement for cooperation between the European Atomic Energy Community and the Government of Japan in the field of controlled thermonuclear fusion,

HAS DECIDED AS FOLLOWS:

#### Article 1

The Agreement for cooperation between the European Atomic Energy Community and the Government of Japan in the field of controlled thermonuclear fusion, shall be concluded on behalf of the Community.

The text of the Agreement for cooperation is appended to this Decision.

#### Article 2

The President of the Commission is empowered to designate the person authorized to sign the Agreement for cooperation for the purpose of committing the European Atomic Energy Community.

Done at Brussels, 10 February 1989.

For the Commission,  
Filippo M. PANDOLFI  
Vice-President

## AGREEMENT

for cooperation between the European Atomic Energy Community and the Government of Japan in the field of controlled thermonuclear fusion

THE EUROPEAN ATOMIC ENERGY COMMUNITY  
(hereinafter referred to as 'EURATOM'), and

THE GOVERNMENT OF JAPAN,

collectively referred to as 'the Parties',

NOTING the existing cooperation in the field of controlled thermonuclear fusion between the Parties, and wishing to maintain and strengthen cooperation in this field,

DESIRING to facilitate the achievement of fusion energy as a potentially environmentally acceptable, economically competitive, and virtually limitless source of energy.

RECOGNIZING the commonality and complementarity of the Parties' programs in fusion energy research and development,

TAKING INTO ACCOUNT the accomplishments of, and opportunities for, collaboration under the International Energy Agency of the Organisation for Economic Cooperation and Development,

HAVE AGREED AS FOLLOWS:

#### Article I

The objective of this Agreement is to maintain and intensify cooperation between the Parties in the areas covered by their respective fusion programs, on the basis of equality and mutual benefit, in order to develop the scientific understanding and technological capability underlying a fusion power system.

#### Article II

Cooperation under this Agreement may be undertaken in the following areas:

- (a) Tokamaks;
- (b) Alternative lines to tokamaks;
- (c) Fusion technology;
- (d) Plasma physics; and
- (e) Other areas as may be mutually agreed,

as specified in Annexes I, II and III which form an integral part of this Agreement.

### Article III

Cooperation in the areas referred to in Article II may include the following activities:

- (a) Exchange and provision of information;
- (b) Exchange of personnel;
- (c) Meetings of various forms;
- (d) Exchange and provision of samples, materials, instruments, and components;
- (e) Execution of joint studies, projects or experiments; and
- (f) Other activities as may be mutually agreed,

as specified in Annexes, I, II and III

### Article IV

1. The cooperation shall be conducted in accordance with Annexes I, II and III, by EURATOM or any entity or organization associated with it within the framework of the EURATOM Fusion Program or the Joint European Torus (JET) Joint Undertaking, designated by EURATOM for this purpose, and on the Japanese side by the Monbusho, the Ministry of International Trade and Industry and the Science and Technology Agency or any entity or organization designated by them for this purpose.

2.(a) The Annexes shall continue in force as long as this Agreement remains in force, unless terminated earlier in accordance with subparagraph (b) below.

(b) Each Annex may be terminated at any time at the discretion of either party, upon six months' advance notification in writing by the party seeking to terminate the Annex. Such termination shall be without prejudice to the rights that may have accrued under each Annex up to the date of its termination.

(c) All activities not completed at the expiry of each Annex may be continued until their completion under the terms of the Annex concerned.

(d) In the event that, during the period of the Agreement, the nature of either party's fusion program should change substantially, whether this be by substantial expansion, reduction or transformation, or by an amalgamation of major elements with the fusion program of a third party, either party shall have the right to request revisions in the scope and terms of the Annexes concerned.

### Article V

1. The Parties shall establish a Coordinating Committee to facilitate the coordination and implementation of cooperative activities under this Agreement. Each Party shall appoint an equal number of members to the Coordinating Committee and nominate one of its appointed members as the head of its delegation.

2. The Coordinating Committee shall meet annually, alternately in Europe and in Japan, or at other agreed times and places. The head of the delegation of the host Party shall chair the meeting.

3. The functions of the Coordinating Committee shall include:

- (a) reviewing and monitoring the progress of cooperative activities;
- (b) exchanging information and views on scientific and technological policy issues; and
- (c) discussing future cooperative activities.

### Article VI

Treatment of information, industry property and copyright in connection with the cooperative activities under this Agreement is provided in Annexes I, II and III. These provisions are identical in all the Annexes.

### Article VII

Nothing in this Agreement shall be construed to prejudice existing or future arrangements for cooperation between the Parties.

### Article VIII

1. Performance of the Parties under this Agreement shall be subject to the availability of appropriated funds.

2. Cooperation under this Agreement shall be in accordance with the laws and regulations applicable in the respective countries and to EURATOM.

3. Each Party shall use its best endeavours, within the framework of the applicable laws, to facilitate the accomplishment of formalities involved in the movement of persons, the import of materials and equipment and the transfer of currency, which shall be required to conduct the cooperation.

4. Compensation for damages incurred during the implementation of this Agreement shall be in accordance with the laws applicable in the respective countries and to EURATOM.

### Article IX

All questions related to this Agreement will be settled by mutual consultations of the Parties.

### Article X

1. This Agreement shall enter into force on the date of signature thereof. It shall remain in force for three years and shall continue in force thereafter unless terminated by either Party at the end of the initial three-year period

or at any time thereafter by giving to the other Party at least six months' written advance notice of its intention to terminate this Agreement.

2. The termination of this Agreement shall not affect the carrying-out of any project or program undertaken under this Agreement and not fully executed at the time of termination of this Agreement.

3. The termination of this Agreement or its Annexes shall not affect rights and obligations under Article VI or any agreement made in accordance with Article VI.

#### Article XI

1. This Agreement shall apply, in so far as EURATOM is concerned, to the territories in which the Treaty establishing the European Atomic Energy Community is applied and under the conditions laid down in that Treaty.

2. Whenever in this Agreement the words 'country', 'entity', 'organization' or 'national' are used with reference to EURATOM, they shall be understood to mean or to refer to the Member States of EURATOM as well as to the Kingdom of Sweden and the Swiss Confederation which are both associated with the EURATOM Fusion Program and represented in the JET Joint Undertaking.

Done at Brussels on the twentieth day of February 1988, in duplicate in the English and Japanese languages, each version being equally authentic.

For the European Atomic Energy Community, Filippo M. PANDOLFI

For the Government of Japan, Munioki DATE, Ambassador of Japan in the European Communities

#### ANNEX I

Pursuant to Article IV of this Agreement, the Parties hereby establish the following arrangements for specific implementing procedures and details for a program of cooperation in the area of fusion research and development between EURATOM and the Monbusho of Japan (Monbusho) (hereinafter in this Annex referred to as 'the cooperation').

1. EURATOM and Monbusho (hereinafter jointly referred to as 'the implementing agencies') shall each appoint a contact person who is responsible for the coordination of the cooperation and for reporting to the Coordinating Committee referred to in Article V of this Agreement.

2. The implementing agencies may designate appropriate national universities and research institutions under their jurisdiction or associated with them (hereinafter referred to as 'designees'), with the consent of the designees, to cooperate in the implementation of the cooperation.

3. The cooperation may be undertaken in the following area:

3.1. Tokamaks;

3.2. Alternative lines to tokamaks including inertial confinement;

3.3. Fusion technology;

3.4. Plasma theory and applied plasma physics; and

3.5. Other areas as may be mutually agreed by the implementing agencies.

4.1. The cooperation may include the following activities (hereinafter referred to as 'cooperative activities'):

4.1.1. Exchange and provision of scientific and technical information;

4.1.2. Exchange of scientists for participation in research, development, analysis, design, planning and experimental activities;

4.1.3. Holding of seminars and other meetings;

4.1.4. Short-term visits by scientists;

4.1.5. Exchange and provision of equipment, instruments and materials for testing; and

4.1.6. Other activities as may be mutually agreed by the implementing agencies.

4.2. When necessary, any specific details and procedures to implement activities listed in subparagraphs 4.1.1. to 4.1.5. may be determined through consultations or auxiliary arrangements between the implementing agencies or the designees. Specific terms and conditions to implement activities listed in subparagraph 4.1.6. shall be determined through written agreement between the implementing agencies.

5. All costs from the cooperation shall be borne by the implementing agency or the designee which incurs them unless otherwise specifically agreed in writing by the implementing agencies.

6.1. The implementing agencies shall support the widest possible dissemination of information which they have the right to disclose and which is either in their possession or available to them, and is provided or



exchanged under the cooperation subject to the need to protect proprietary information, to copyright restrictions, and to the provisions of paragraph 8.

Upon publication of such information, it shall be made clear that the information was obtained under the cooperation.

6.2. Proprietary information shall be treated as follows:

#### 6.2.1. Definitions

The term 'proprietary information' means scientific or technical data, results or methods of research and development, and any other information intended to be provided or exchanged under the cooperation, such as know-how, information directly related to inventions and discoveries as referred to in paragraph 8, technical, commercial or financial information, provided that it is appropriately marked or considered as such in accordance with subparagraph 6.2.2 and;

- (a) Is not generally known or publicly available from other sources;
- (b) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
- (c) Is not already in the possession of the receiving implementing agency or its designees without obligation concerning its confidentiality.

#### 6.2.2. Procedures

- i) An implementing agency or its receiving proprietary information under the cooperation shall respect the privileged nature thereof. Any document which contains proprietary information shall be clearly marked by the disseminating implementing agency or its designees with the following (or substantially similar) restrictive provision;

This document contains proprietary information furnished in confidence under Annex I to the Agreement for Cooperation between the European Atomic Energy Community and the Government of Japan in the field of controlled thermonuclear fusion, dated 20 February 1989 and shall not be disseminated outside EURATOM and Monbusho, their contractors, licencees and the designees without the prior approval of...

This notice shall be marked on any reproduction of this document, in whole or in part. These limitations shall automatically terminate when this information is disclosed by the owner without restriction.

- ii) Proprietary information received in confidence under the cooperation may be disseminated by the receiving implementing agency or its designees to:

- (a) Persons within or employed by the receiving implementing agency or by other concerned government departments and agencies or by the designees in the country of the receiving implementing agency;

- (b) Contractors or subcontractors of the receiving implementing agency or its designees in the country of the receiving implementing agency for use only within the framework of their contracts with the receiving implementing agency or its designees in work relating to the subject matter of the proprietary information;

provided that any proprietary information so disseminated shall be marked with a restrictive provision substantially identical to that appearing in point (i).

- iii) With the prior written consent of the implementing agency providing proprietary information under the cooperation, the receiving implementing agency may disseminate such proprietary information more widely than otherwise permitted in the foregoing point (ii). The implementing agencies shall cooperate with each other in developing procedures for requesting and obtaining prior written consent for such wider dissemination, and each implementing agency will grant such approval to the extent permitted by the laws and regulations applicable in the respective countries and to EURATOM and by policies of the Parties.

- 6.3. If one of the implementing agencies becomes aware that it or its designees will be, or may reasonably be expected to become, unable to meet the restrictions and conditions of dissemination in this paragraph, it shall immediately inform the other implementing agency. The implementing agencies shall thereafter consult to define as appropriate course of action.

- 6.4. Information arising from seminars, workshops, and other meetings, the assignment of staff, use of facilities and exchange of equipment arranged under the cooperation shall be treated by the implementing agencies and their designees according to the principles specified in this paragraph, provided that no proprietary information orally communicated shall be subject to the limited disclosure requirements of the cooperation unless the individual communicating such information places the recipient on notice as to the proprietary nature of the information communicated.

- 7. The transmitting implementing agency or its designees in its relation with the receiving implementing agency or its designees does not warrant the suitability of any information transmitted for any particular use or application.

- 8.1. With respect to any invention or discovery made or conceived in the execution of the cooperation, the implementing agencies will take all necessary steps within the framework of the applicable laws and regulations with a view to realizing the following.
- 8.1.1. Where the invention or discovery is made or conceived by personnel (the inventor) of either implementing agency (the assigning agency) or its designees or their contractors while assigned to the other implementing agency (the receiving agency) or its designees or their contractors in connection with exchanges of scientists, engineers and other specialists;
- i) The receiving agency or its designees shall acquire all rights, title and interest in and to any such invention or discovery in its own country and in third countries; and
- ii) The assigning agency or its designees or the inventor shall acquire all rights, title and interest in and to any such invention or discovery in its own country.
- 8.1.2. In cases to which subparagraph 8.1.1. does not apply and where the invention or discovery is made or conceived by personnel (the inventor) of either implementing agency or its designees or their contractors as a direct result of employing information which has been communicated to them under the cooperation by the other implementing agency or its designees or their contractors or communicated during seminars or other joint meetings, the implementing agency or its designees or their contractors whose personnel make the invention or the inventor shall acquire all rights, title, and interest in and to such invention or discovery in all countries.
- 8.1.3. Either the implementing agency or its designees or their contractors or the inventor, whichever of them owns the invention referred to in subparagraphs 8.1.1. and 8.1.2. shall license such invention to the other implementing agency, its designees, its government and the nationals of its country designated by it, upon request of the other implementing agency or its designees on reasonable terms and conditions.
- 8.1.4. With regard to industrial property rights related to inventions or discoveries resulting from cooperative activities other than exchange of personnel or information, the implementing agencies or the designees shall, prior to commencing such cooperative activities, decide on an appropriate distribution of such rights taking into consideration the benefits, rights and contribution of the implementing agencies or the designees.
- 8.2. The provisions of subparagraph 8.1 shall apply *mutatis mutandis* to the protection of utility model and of design.
- 8.3. Each implementing agency or its designees shall assume the responsibility to pay awards or compensation required to be paid to its own employees or nationals of respective countries in accordance with the applicable laws. Each implementing agency or its designees shall, without prejudice to any rights of inventors under the applicable laws, take all necessary steps to provide the cooperation of its inventors required to implement the provisions of this paragraph.
9. Copyrights of the implementing agencies or the designees shall be accorded treatment consistent with the Universal Copyright Convention as revised at Paris on 24 July 1971. As to copyrights on materials within the scope of subparagraph 6.1. owned or controlled by either implementing agency or its designees, that implementing agency or its designees shall make efforts to grant to the other implementing agency or its designees a license to reproduce or translate copyrighted material.
10. With respect to the exchange of staff under the cooperation, the following provisions shall apply.
- 10.1. Whenever an exchange of staff is contemplated under the cooperation, each implementing agency or its designees shall ensure that qualified staff are selected for assignment to the other implementing agency or its designees.
- 10.2. Each such assignment of staff shall be the subject of a separate assignment agreement between the implementing agencies or the designees.
- 10.3. Each implementing agency or its designees shall be responsible for the salaries, insurance and allowances to be paid to its staff.
- 10.4. Unless otherwise agreed, the sending implementing agency or its designees shall pay for the travel and living expenses of its staff while on assignment.
- 10.5. The receiving implementing agency or its designees shall arrange for adequate accommodation for the assigned staff and their families on a mutually agreeable reciprocal basis.
- 10.6. The receiving implementing agency or its designees shall provide all necessary assistance to the assigned staff and their families as regards administrative formalities (travel arrangements, etc).

- 10.7. The assigned staff of the sending implementing agency or its designees shall conform to the general and special rules of work and safety regulations in force at the host establishment, or as agreed in a separate assignment agreement.
  11. In the event that equipment, instruments, materials or necessary spare parts (hereinafter jointly referred to as 'equipment, etc.') are to be exchanged or provided by one implementing agency or its designees to the other implementing agency or its designees, the following provisions shall apply covering the shipment and use of such equipment, etc.
    - 11.1. The sending implementing agency or its designees shall supply as soon as possible a detailed list of the equipment, etc, to be provided together with the relevant specifications and technical and informational documentation.
    - 11.2. Equipment, etc, provided by the sending implementing agency or its designees shall remain their property and shall be returned to the sending implementing agency or its designees upon completion of the mutually agreed activity unless otherwise agreed.
    - 11.3. Equipment, etc, shall be brought into operation at the host establishment only by mutual agreement between the implementing agencies or the designees.
    - 11.4. The receiving implementing agency or its designees shall provide the necessary premises for the equipment, etc, and shall provide for electrical power, water, gas, etc, in accordance with technical requirements which shall be mutually agreed by the implementing agencies or the designees.
    - 11.5. Unless otherwise agreed, responsibility for the transport of the equipment, etc, from the sending implementing agency or its designees to their ultimate destination in the country of the receiving implementing agency or its designees and return, and for their safekeeping and insurance *en route*, together with expenses relating thereto shall be undertaken by the sending implementing agency or its designees.
    - 11.6. The receiving implementing agency or its designees shall notify the customs authorities that it considers the equipment, etc, provided by the sending implementing agency or its designees for carrying out mutually agreed activities to be of a scientific character and not of a commercial character.
- ANNEX II**
- Pursuant to Article IV of this Agreement, the Parties hereby establish the following arrangements for specific implementing procedures and details for a program of cooperation in the area of fusion research and development between EURATOM and the Ministry of International Trade and Industry of Japan (MITI) (hereinafter in this Annex referred to as 'the cooperation').
1. EURATOM and MITI (hereinafter jointly referred to as 'the implementing agencies') shall each appoint a contact person who is responsible for the coordination of the cooperation and for reporting to the coordinating Committee referred to in Article V of this Agreement.
  2. The implementing agencies may designate their attached or associated institutes (hereinafter referred to as 'designees'), with the consent of the designees, to cooperate in the implementation of the cooperation.
  3. The cooperation may be undertaken in the following areas:
    - 3.1. Tokamaks, including the projects of present generation and activities related to those of the next generation;
    - 3.2. Alternative lines to tokamaks including inertial confinement and reversed field pinch;
    - 3.3. Fusion technology including plasma engineering;
    - 3.4. Plasma theory and applied plasma physics; and
    - 3.5. Other areas as may be mutually agreed by the implementing agencies.
  4. The cooperation may include the following activities (hereinafter referred to as 'cooperative activities'):
    - 4.1.1. Exchange and provision of information and data on scientific and technical activities, developments, practices and results, and on program policies and plans;
    - 4.1.2. Exchange of scientists, engineers and other specialists for agreed periods of time in order to participate in experiments, analysis, design and other research and development activities;
    - 4.1.3. Meetings of various forms to discuss and exchange information on scientific and technological aspects of general or specific subjects and to identify cooperative actions;
    - 4.1.4. Exchange and provision of samples, materials, instruments and components for experiments, testing and evaluation;
    - 4.1.5. Conduct of joint studies, projects or experiments including their joint design, construction and operation; and

4.1.6. Other activities as may be mutually agreed by the implementing agencies.

4.2. When necessary, any specific details and procedures to implement activities listed in subparagraphs 4.1.1. to 4.1.5. may be determined through consultations or auxiliary arrangements between the implementing agencies or the designees. Specific terms and conditions necessary to implement activities listed in subparagraph 4.1.6. shall be determined through written agreement between the implementing agencies.

5. All costs resulting from the cooperation shall be borne by the implementing agency or the designee which incurs them unless otherwise specifically agreed in writing by the implementing agencies.

6.1. The implementing agencies shall support the widest possible dissemination of information which they have the right to disclose and which is either in their possession or available to them, and is provided or exchanged under the cooperation subject to the need to protect proprietary information, to copyright restrictions, and to the provisions of paragraph 8.

Upon publication of such information, it shall be made clear that the information was obtained under the cooperation.

6.2. Proprietary information shall be treated as follows:

#### 6.2.1. Definitions

The term 'proprietary information' means scientific or technical data, results or methods of research and development, and any other information intended to be provided or exchanged under the cooperation, such as know-how, information directly related to inventions and discoveries as referred to in paragraph 8, technical, commercial or financial information, provided that it is appropriately marked or considered as such in accordance with subparagraph 6.2.2. and;

- a) Is not generally known or publicly available from other sources;
- b) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
- c) Is not already in the possession of the receiving implementing agency or its designees without obligation concerning its confidentiality.

#### 6.2.2. Procedures

- i) An implementing agency or its designees receiving proprietary information under the cooperation shall respect the privileged nature thereof. Any document which contains proprietary information shall be

clearly marked by the disseminating implementing agency or its designees with the following (or substantially similar) restrictive provision:

This document contains proprietary information furnished in confidence under Annex II to the Agreement for Cooperation between the European Atomic Energy Community and the Government of Japan in the field of controlled thermonuclear fusion, dated 20 February 1989 and shall not be disseminated outside EURATOM and MITI, their contractors, licensees and the designees without the prior approval of...

This notice shall be marked on any reproduction of this document, in whole or in part. These limitations shall automatically terminate when this information is disclosed by the owner without restriction.

- ii) Proprietary information received in confidence under the cooperation may be disseminated by the receiving implementing agency or its designees to:

- a) Persons within or employed by the receiving implementing agency or by other concerned government departments and agencies or by the designees in the country of the receiving implementing agency;

- b) Contractors or subcontractors of the receiving implementing agency or its designees in the country of the receiving implementing agency for use only within the framework of their contracts with the receiving implementing agency or its designees in work relating to the subject matter of the proprietary information;

provided that any proprietary information so disseminated shall be marked with a restrictive provision substantially identical to that appearing in point (i).

- iii) With the prior written consent of the implementing agency providing proprietary information under the cooperation, the receiving implementing agency may disseminate such proprietary information more widely than otherwise permitted in the foregoing point (ii). The implementing agencies shall cooperate with each other in developing procedures for requesting and obtaining prior written consent for such wider dissemination, and each implementing agency will grant such approval to the extent permitted by the laws and regulations applicable in the respective countries and to EURATOM and by policies of the Parties.

6.2.3. If one of the implementing agencies becomes aware that it or its designees will be, or may reasonably be expected to become, unable to meet the restrictions and conditions of dissemination in this paragraph, it shall immediately inform the other implementing agency. The implementing agencies shall thereafter consult to define an appropriate course of action.

- 6.2.4. Information arising from seminars, workshops, and other meetings, the assignment of staff, use of facilities and exchange of equipment arranged under the cooperation shall be treated by the implementing agencies and their designees according to the principles specified in this paragraph provided that no proprietary information orally communicated shall be subject to the limited disclosure requirements of the cooperation unless the individual communicating such information places the recipient on notice as to the proprietary nature of the information communicated.
7. The transmitting implementing agency or its designees in its relation with the receiving implementing agency or its designees does not warrant the suitability of any information transmitted for any particular use or application.
- 8.1. With respect to any invention or discovery made or conceived in the execution of the cooperation, the implementing agencies will take all necessary steps within the framework of the applicable laws and regulations with a view to realizing the following.
- 8.1.1. Where the invention or discovery is made or conceived by personnel (the inventor) of either implementing agency (the assigning agency) or its designees or their contractors while assigned to the other implementing agency (the receiving agency) or its designees or their contractors in connection with exchanges of scientists, engineers and other specialists:
- i) The receiving agency or its designees shall acquire all rights, title and interest in and to any such invention or discovery in its own country and in third countries; and
  - ii) The assigning agency or its designees or the inventor shall acquire all rights, title and interest in and to any such invention or discovery in its own country.
- 8.1.2. In cases to which subparagraph 8.1.1. does not apply and where the invention or discovery is made or conceived by personnel (the inventor) of either implementing agency or its designees or their contractors as a direct result of employing information which has been communicated to them under the cooperation by the other implementing agency or its designees or their contractors or communicated during seminars or other joint meetings, the implementing agency or its designees or their contractors whose personnel make the invention or the inventor shall acquire all rights, title and interest in and to such invention or discovery in all countries.
- 8.1.3. Either the implementing agency or its designees or their contractors or the inventor, whichever of them owns the invention referred to in subparagraphs 8.1.1. and 8.1.2. shall license such invention to the other implementing agency, its designees, its government and the nationals of its country designated by it, upon request of the other implementing agency or its designees on reasonable terms and conditions.
- 8.1.4. With regard to industrial property rights related to inventions or discoveries resulting from cooperative activities other than exchange of personnel or information, the implementing agencies or the designees shall, prior to commencing such cooperative activities, decide on an appropriate distribution of such rights taking into consideration the benefits, rights and contribution of the implementing agencies or the designees.
- 8.2. The provisions of the subparagraph 8.1. shall apply *mutatis mutandis* to the protection of utility model and of design.
- 8.3. Each implementing agency or its designees shall assume the responsibility to pay awards or compensation required to be paid to its own employees or nationals of respective countries in accordance with the applicable laws. Each implementing agency or its designees shall, without prejudice to any rights of inventors under the applicable laws, take all necessary steps to provide the cooperation of its inventors required to implement the provisions of this paragraph.
9. Copyrights of the implementing agencies or the designees shall be accorded treatment consistent with the Universal Copyright Convention as revised at Paris on 24 July 1971. As to copyrights on materials within the scope of subparagraph 6.1. owned or controlled by either implementing agency or its designees, that implementing agency or its designees shall make efforts to grant to the other implementing agency or its designees a license to reproduce or translate copyrighted material.
10. With respect to the exchange of staff under the cooperation, the following provisions shall apply.
- 10.1. Whenever an exchange of staff is contemplated under the cooperation, each implementing agency or its designees shall ensure that qualified staff are selected for assignment to the other implementing agency or its designees.
- 10.2. Each such assignment of staff shall be the subject of a separate assignment agreement between the implementing agencies or the designees.

- 10.3. Each implementing agency or its designees shall be responsible for the salaries, insurance and allowances to be paid to its staff.
- 10.4. Unless otherwise agreed, the sending implementing agency or its designees shall pay for the travel and living expenses of its staff while on assignment.
- 10.5. The receiving implementing agency or its designees shall arrange for adequate accommodation for the assigned staff and their families on a mutually agreeable reciprocal basis.
- 10.6. The receiving implementing agency or its designees shall provide all necessary assistance to the assigned staff and their families as regards administrative formalities (travel arrangement, etc).
- 10.7. The assigned staff of the sending implementing agency or its designees shall conform to the general and special rules of work and safety regulations in force at the host establishment, or as agreed in a separate assignment agreement.
11. In the event that equipment, instruments, materials or necessary spare parts (hereinafter jointly referred to as 'equipment, etc.') are to be exchanged or provided by one implementing agency or its designees to the other implementing agency or its designees, the following provisions shall apply covering the shipment and use of such equipment, etc.
- 11.1. The sending implementing agency or its designees shall supply as soon as possible a detailed list of equipment, etc, to be provided together with the relevant specification and technical and informational documentation.
- 11.2. Equipment, etc, provided by the sending implementing agency or its designees shall remain their property and shall be returned to the sending implementing agency or its designees upon completion of the mutually agreed activity unless otherwise agreed.
- 11.3. Equipment, etc, shall be brought into operation at the host establishment only by mutual agreement between the implementing agencies or the designees.
- 11.4. The receiving implementing agency or its designees shall provide the necessary premises for the equipment, etc, and shall provide for electrical power, water, gas, etc, in accordance with technical requirements which shall be mutually agreed by the implementing agencies or the designees.
- 11.5. Unless otherwise agreed, responsibility for the transport of the equipment, etc, from the sending implementing agency or its designees to their ultimate destination in the country of the receiving implementing agency or its designees and return

and for their safekeeping and insurance *en route*, together with expenses relating thereto shall be undertaken by the sending implementing agency or its designees.

- 11.6. The receiving implementing agency or its designees shall notify the customs authorities that it considers the equipment, etc, provided by the sending implementing agency or its designees for carrying out mutually agreed activities to be of a scientific and not of a commercial character.

### ANNEX III

Pursuant to Article IV of this Agreement, the Parties hereby establish the following arrangements for specific implementing procedures and details for a program of cooperation in the area of fusion research and development between EURATOM and the Science and Technology Agency of Japan (STA) (hereinafter in this Annex referred to as 'the cooperation').

1. EURATOM and STA (hereinafter jointly referred to as 'the implementing agencies') shall each appoint a contact person who is responsible for the coordination of the cooperation and for reporting to the Coordinating Committee referred to in Article V of this Agreement.
2. The implementing agencies may designate official institutions whose annual budgets and operating plans are approved by the head of the implementing agency respectively or its attached or associated institutes (hereinafter referred to as 'Designees') with the consent of the designees, to cooperate in the implementation of the cooperation.
3. The cooperation may be undertaken in the following areas:
  - 3.1. Tokamaks, including the large projects of the present generation (including JET and JT-60) and activities related to those of the next generation;
  - 3.2. Alternative lines to tokamaks;
  - 3.3. Fusion technology;
  - 3.4. Plasma theory and applied plasma physics; and
  - 3.5. Other areas as may be mutually agreed by the implementing agencies.
- 4.1. The cooperation may include the following activities (hereinafter referred to as 'cooperative activities'):
  - 4.1.1. Exchange and provision of information and data on scientific and technical activities, development, practices and results, and on program policies and plans;

- 4.1.2. Exchange of scientists, engineers and other specialists for agreed periods of time in order to participate in experiments, analysis, design and other research and development actions;
- 4.1.3. Meetings of various forms to discuss and exchange information on scientific and technological aspects of general or specific subjects and to identify cooperative actions;
- 4.1.4. Exchange and provision of samples, materials, instruments and components for experiments, testing and evaluation;
- 4.1.5. Conduct of joint studies, projects or experiments including their joint design, construction and operation; and
- 4.1.6. Other activities as may be mutually agreed by the implementing agencies.
- 4.2. When necessary, any specific details and procedures to implement activities listed in subparagraphs 4.1.1. to 4.1.5. may be determined through consultations or auxiliary arrangements between the implementing agencies or the designees. Specific terms and conditions necessary to implement activities listed in subparagraph 4.1.6. shall be determined through written agreement between the implementing agencies.
- 5. All costs resulting from cooperation shall be borne by the implementing agency or the designees which incurs them unless otherwise specifically agreed in writing by the implementing agencies.
- 6.1. The implementing agencies shall support the widest possible dissemination of information which they have the right to disclose and which is either in their possession or available to them, and is provided or exchanged under the cooperation subject to the need to protect proprietary information, to copyright restrictions, and to the provisions of paragraph 8.

Upon publication of such information, it shall be made clear that the information was obtained under the cooperation.

6.2. Proprietary information shall be treated as follows:

#### 6.2.1. Definitions

The term 'proprietary information' means scientific or technical data, results or methods of research and development, and any other information intended to be provided or exchanged under the cooperation, such as know-how, information directly related to inventions and discoveries as referred to in paragraph 8, technical, commercial or financial information, provided that it is appropriately marked or considered as such in accordance with subparagraph 6.2.2. and;

- a) Is not generally known or publicly available from other sources;
- b) Has not previously been made available by the owner to others without obligation concerning its confidentiality; and
- c) Is not already in the possession of the receiving implementing agency or its designees without obligation concerning its confidentiality.

#### 6.2.2. Procedures

- i) An implementing agency or its designees proprietary information under the cooperation shall respect the privileged nature thereof. Any document which contains proprietary information shall be clearly marked by the disseminating implementing agency or its designees with the following (or substantially similar) restrictive provision:

'This document contains proprietary information furnished in confidence under Annex III to the Agreement for Cooperation between the European Atomic Energy Community and the Government of Japan in the field of controlled thermonuclear fusion, dated 20 February 1989 and shall not be disseminated outside EURATOM and STA, their contractors, licensees and the designees without the prior approval of ...

This notice shall be marked on any reproduction of this document, in whole or in part. These limitations shall automatically terminate when this information is disclosed by the owner without restriction.'

- ii) Proprietary information received in confidence under the cooperation may be disseminated by the receiving implementing agency or its designees to:
  - a) Persons within or employed by the receiving implementing agency or by other concerned government departments and agencies or by the designees in the country of the receiving implementing agency;
  - b) Contractors or subcontractors of the receiving implementing agency or its designees in the country of the receiving implementing agency for use only within the framework of their contracts with the receiving implementing agency or its designees in work relating to the subject matter of the proprietary information;

Provided that any proprietary information so disseminated shall be marked with a restrictive provision substantially identical to that appearing in point (i).

- iii) With the prior written consent of the implementing agency providing proprietary information under the cooperation, the receiving implementing agency may disseminate such proprietary information more widely than otherwise permitted in the foregoing point (ii). The implementing agencies shall cooperate

with each other in developing procedures for requesting and obtaining prior written consent for such wider dissemination, and each implementing agency will grant such approval to the extent permitted by the laws and regulations applicable in the respective countries and to EURATOM and by policies of the parties.

- 6.2.3. If one of the implementing agencies becomes aware that it or its designees will be, or may reasonably be expected to become unable to meet the restrictions and conditions of dissemination in this paragraph, it shall immediately inform the other implementing agency. The implementing agencies shall thereafter consult to define an appropriate course of action.
- 6.2.4. Information arising from seminars, workshops, and other meetings, the assignment of staff, use of facilities and exchange of equipment arranged under the cooperation shall be treated by the implementing agencies and their designees according to the principles specified in this paragraph, provided that no proprietary information orally communicated shall be subject to the limited disclosure requirements of the cooperation unless the individual communicating such information places the recipient on notice as to the proprietary nature of the information communicated.
7. The transmitting implementing agency or its designees in its relation with the receiving implementing agency or its designees does not warrant the suitability of any information transmitted for any particular use or application.
- 8.1. With respect to any invention or discovery made or conceived in the execution of the cooperation, the implementing agencies will take all necessary steps within the framework of the applicable laws and regulations with a view to realizing the following.
  - 8.1.1. Where the invention or discovery is made or conceived by personnel (the inventor) of either implementing agency (the assigning agency) or its designees or their contractors while assigned to the other implementing agency (the receiving agency) or its designees or their contractors in connection with exchanges of scientists, engineers and other specialists:
    - i) The receiving agency or its designees shall acquire all rights, title and interest in and to any such invention or discovery in its own country and in third countries; and
    - ii) The assigning agency or its designees or the inventor shall acquire all rights, title and interest in and to any such invention or discovery in its own country.

- 8.1.2. In cases to which subparagraph 8.1.1. does not apply and where the invention or discovery is made or conceived by personnel (the inventor) of either implementing agency or its designees or their contractors as a direct result of employing information which has been communicated to them under the cooperation by the other implementing agency or its designees or their contractors or communicated during seminars or other joint meetings, the implementing agency or its designees or their contractors whose personnel make the invention or the inventor shall acquire all rights, title, and interest in and to such invention or discovery in all countries.
- 8.1.3. Either the implementing agency or its designees or their contractors or the inventor, whichever of them owns the invention referred to in subparagraphs 8.1.1. and 8.1.2. shall license such invention to the other implementing agency, its designees, its government and the nationals of its country designated by it, upon request of the other implementing agency or its designees on reasonable terms and conditions.
- 8.1.4. With regard to industrial property rights related to inventions or discoveries resulting from cooperative activities other than exchange of personnel or information, the implementing agencies or the designees shall, prior to commencing such cooperative activities, decide on an appropriate distribution of such rights taking into consideration the benefits, rights and contribution of the implementing agencies or the designees.
- 8.2. The provisions of subparagraph 8.1. shall apply *mutatis mutandis* to the protection of utility model and of design.
- 8.3. Each implementing agency or its designees shall assume the responsibility to pay awards or compensation required to be paid to its own employees or nationals of respective countries in accordance with the applicable laws. Each implementing agency or its designees shall, without prejudice to any rights of inventors under the applicable laws, take all necessary steps to provide the cooperation of its inventors required to implement the provisions of this paragraph.
9. Copyrights of the implementing agencies or the designees shall be accorded treatment consistent with the Universal Copyright Convention as revised at Paris on 24 July 1971. As to copyrights on materials within the scope of subparagraph 6.1. owned or controlled by either implementing agency or its designees, that implementing agency or its designees shall make efforts to grant to the other implementing agency or its designees a license to reproduce or translate copyrighted material.



10. With respect to the exchange of staff under the cooperation, the following provisions shall apply.
  - 10.1. Whenever an exchange of staff is contemplated under the cooperation, each implementing agency or its designees shall ensure that qualified staff are selected for assignment to the other implementing agency or its designees.
  - 10.2. Each such assignment of staff shall be the subject of a separate assignment agreement between the implementing agencies or the designees.
  - 10.3. Each implementing agency or its designees shall be responsible for the salaries, insurance and allowances to be paid to its staff.
  - 10.4. Unless otherwise agreed, the sending implementing agency or its designees shall pay for the travel and living expenses of its staff while on assignment.
  - 10.5. The receiving implementing agency or its designees shall arrange for adequate accommodation for the assigned staff and their families on a mutually reciprocal basis.
  - 10.6. The receiving implementing agency or its designees shall provide all necessary assistance to the assigned staff and their families as regards administrative formalities (travel arrangements, etc).
  - 10.7. The assigned staff of the sending implementing agency or its designees shall conform to the general and special rules of work and safety regulations in force at the host establishment, or as agreed in a separate assignment agreement.
11. In the event that equipment, instruments, materials or necessary spare parts (hereinafter jointly referred to as 'equipment, etc.') are to be exchanged or provided by one implementing agency or its designees to the other implementing agency or its designees, the following provisions shall apply covering the shipment and use of such equipment, etc.
  - 11.1. The sending implementing agency or its designees shall supply as soon as possible a detailed list of the equipment, etc, to be provided together with the relevant specifications and technical and informational documentation.
  - 11.2. Equipment, etc, provided by the sending implementing agency or its designees shall remain their property and shall be returned to the sending implementing agency or its designees upon completion of the mutually agreed activities unless otherwise agreed.
  - 11.3. Equipment, etc, shall be brought into operation at the host establishment only by mutual agreement between the implementing agencies or the designees.
  - 11.4. The receiving implementing agency or its designees shall provide the necessary premises for the equipment, etc, and shall provide for electrical power, water, gas, etc, in accordance with technical requirements which shall be mutually agreed by the implementing agencies or the designees.
  - 11.5. Unless otherwise agreed, responsibility for the transport of the equipment, etc, from the sending implementing agency or its designees to their ultimate destination in the country of the receiving implementing agency or its designees and return, and for their safekeeping and insurance *en route*, together with expenses relating thereto shall be undertaken by the sending implementing agency or its designees.
  - 11.6. The receiving implementing agency or its designees shall notify the customs authorities that it considers the equipment, etc, provided by the sending implementing agency or its designees for carrying out mutually agreed activities to be of a scientific character and not of a commercial character.

## FEDERAL REPUBLIC OF GERMANY

### Chancellor Kohl on Nuclear Waste Management

LD1304131189 Hamburg DPA in German  
1152 GMT 13 Apr 89

[Text] Bonn (DPA)—The future of the disputed nuclear reprocessing installation in Bavarian Wackersdorf is uncertain. Federal Chancellor Helmut Kohl (CDU) today declined to answer the question of whether the Federal Government is adhering to the project "without ifs and buts."

Because of the intention of the Federal German power plant enterprise VEBA AG to allow spent fuel rods to be reprocessed in France, a "new situation" has arisen, Kohl said at the Federal news conference. This declaration of intent does not affect the current national waste management program—to which Wackersdorf belongs—and also changes nothing of the necessity to reuse spent fuel elements.

Nevertheless, there are now numerous "extremely difficult questions" in connection with the waste management of nuclear power plants to be cleared up. There are still "enormous problems." The Federal Government will propose that France set up a "small working group with great authority." There will be a preliminary exchange of opinion during the next Franco-German Government consultations next week.

If the need should arise after the beginning of a closer cooperation between VEBA and its French partner COGEMA to "state more precisely" the waste management program—according to Kohl not until after the year 2000—then this would have to be done with special responsibility for the interests of Bavaria and Upper Palatinate, where Wackersdorf is situated.

## IRELAND

### Radioactive Waste Disposal Site Under Consideration

51500114 Dublin *IRISH INDEPENDENT* in English  
25 Feb 89 p 6

[Article by Geraldine Collins]

[Text] The Government and the Nuclear Energy Board are considering setting up a radioactive waste disposal site, it was revealed yesterday. But the fears of local people would be taken into account and they would have to be represented in a trustee monitoring group, said Energy Minister Michael Smith.

The Government and everybody which used ionizing radiation were concerned about the problem of disposing of contaminated material. "I would like to see a long-term solution to this problem and my Department and the NEB have been working on it for some time," he told a Radiation Research and Protection Society symposium in Dublin.

Mr Smith admitted any proposal to set up a waste disposal facility would have to deal with "legitimate concerns" and an "imaginative consultation process" would be necessary involving people living near the site.

He hoped to publish Bill shortly setting up a radiation protection body to replace the NEB. The Board was lashed as being "pro-nuclear" by environmental groups before and after the Chernobyl disaster.

The new Bill would also cover areas of legislation which were found to be inadequate or inappropriate at the time of Chernobyl. If there was another radiological emergency there would be "no doubt about whether the necessary powers exist for monitoring, sampling or taking any necessary action to protect the public."

An emergency plan drawn up after Chernobyl would be fully in place by the end of 1990, he revealed. He claimed that since that tragedy the country had made significant steps forward in the area of radiation protection.

The Minister said he was hopeful progress would be made this year on the problem of unacceptable levels of background radiation in parts of the country. "The question of remedial measures to deal with the problem is a complex one and is being examined both here and abroad in an effort to come up with satisfactory solutions," he said.

The transboundary effects of radioactive pollution had been brought home to everyone as a result of Chernobyl, which had changed the world's perception of nuclear matters.

## UNITED KINGDOM

### BBC Program on Condor Missile Development

PM1104035389 London *BBC Television Service* in English 2035 GMT 10 Apr 89

[From the "Panorama" program presented by Jane Corbin—recorded]

[Text]

[Corbin] The condor, the world's largest bird of prey, inhabits the remote mountains of South America. The condor has given its name to a new weapon of mass terror—a missile being developed by Argentina in a secret hilltop bunker. But the Condor will fly not only in South American skies but also over the deserts of the Middle East, where Egypt and Iraq are Argentina's collaborators in the project.

Here, a chemical attack is Israel's nightmare—her Army trains for such an emergency: a fear that a Condor missile, equipped with a poison warhead, could be aimed at Israel's cities. This prospect has thrust the issue of missile proliferation to the top of the West's political agenda.

[Dan Quayle, U.S. Vice President] The acquisition of the ballistic missile capability is on the march, and therefore, there is more attention being paid to this. Probably one of the reasons that we're having this interview right now, there is much more of an interest in the acquisition of this ballistic missile and capability by countries that didn't have it before. And then you take not just the ballistic missile capability, but add a chemical warhead to that—and the two, unfortunately, are beginning to merge—and by having a chemical capability on the top of a ballistic missile, you have real problems and a potential for real destabilization, regionally as well as globally.

[Corbin] This is the story of a top secret missile named the Condor, a weapon which could revolutionize warfare here in the Middle East, where two countries—Iraq and Egypt—are building this missile. The Condor was conceived and developed in Argentina, and it could pose a threat to the Falkland Islands and to Britain's interests, too. The West has tried to stop what it fears will be a deadly marriage between chemical weapons and rocket technology; but the Condor is well down the road towards completion—thanks to European companies and European scientists prepared to risk the consequences of selling their expertise to build this missile.

The Condor was conceived in Argentina in the early 1980's—the pet project of the commander of the Air Force. A site was chosen in the province of Cordoba,

Argentina's observatory and satellite ground station are conveniently nearby. The military control the 1 billion pound program based at Faldo del Carmen in the Sierra Chica Mountains. Here a series of reinforced bunkers have been built deep into the mountain: Inside are laboratories for assembling and testing missile parts.

According to locals like Pascal Suez, who was a laborer on the site, the works director was a German. It was widely known locally that Faldo del Carmen was a missile factory.

[Suez, in Spanish fading into superimposed English] The building works started with moving earth, then laying the foundations. There were at least 8 or 10 buildings, and it took 3 years to build, finishing in 1986. It was the German who was the boss: He managed everything—materials for the site, transport. Computers were brought in on closed trucks in containers—nobody knew a thing.

[Corbin] The nearby resort town of Alta Gracia saw an influx of foreigners: engineers and scientists brought in to provide the technical know-how and logistical support to build the missiles. Up to 150 people from Germany, France, and Italy arrived. Many of them stayed in the Sierras Hotel, according to the work manager there.

[Rosendo Zacharias, in Spanish fading into superimposed English] We didn't have any contact with them—we just saw them around. They used to leave at seven in the morning by coach to work at Faldo de Carmen. We knew they were scientists because they wore identity cards. The order to put them up in the hotel came from the presidential palace, from Buenos Aires.

[Corbin] In 1985 the Argentinians displayed an early version of the Condor, the Condor Ia, at the Paris air show. They claimed it was for civilian uses, for meteorological research. Since then, this prototype's been developed into a missile, the Condor 2. Condor 2 is a ballistic missile, fired from a ground-launch vehicle: It has a two-stage rocket to be powered by solid fuel motors. The missile's guidance system is preset before launch, and at the back, fins and nozzles help control the flight direction. After launch, the first stage falls away, the second stage propels the rocket on. Condor can carry a warhead of up to 500 kg: It has a range of 1,000 km and is accurate to within 750 meters.

[Quayle] If you take a missile that, say, has a range of 1,000 km, it could very easily be adjusted through engineering devices to take the range from 1,000 km to 1,500 km or 2,000 km or 2,500 km—and then, you have countries that possess these weapons really having potential to destabilize much beyond the region. This concerns me about the Condor missile as well as other missiles that have this capability.

[Corbin] Theoretically, Condor could carry a nuclear warhead, but it's more likely to have a chemical or explosive warhead. A chemical warhead is simple to

make: An outside casing containing, for example, a nerve agent, and a bursting charge to disperse the contents. But Argentina is developing a high explosive—a state of the art conventional warhead for Condor. As the missile nears its target, fuel explodes, creating temperatures of 2,000 degrees, suffocating people on the ground; submunitions, small bomblets spray out devastating strategic installations. Such a warhead might be aimed at Port Stanley or the Falklands runway.

[William Waldegrave, U.K. Foreign Office Minister] We have to consider that it might be used against the Falklands, though it would be a very stupid weapon with which to pursue a claim to the Falklands—but it's again another example in a region which isn't inherently stable of something that might start up a dangerous arms race which may lead who knows where. It has two other aspects which are worrying: first, that it might get sold into other markets around the world because all these countries are short of real money, and they'll [Waldegrave changes thought] Potentially, there's a danger of them selling it to anybody who can pay; and second, according to the Argentinian press, the partners—Egypt and Iraq—are Middle Eastern partners, and that is of all regions, the region where it's easiest to imagine a scenario where the introduction of medium-range rocketry leads pretty swiftly to war.

[Corbin] The Middle Eastern connection was established in 1984. By then, Argentina was running short of money, and Egypt—in partnership with Iraq—offered financial support. Abu Ghazalah 'Abd al-Halim, Egypt's defense minister and a man committed to the expansion of his country's armament industry, sent a delegation to Buenos Aires to negotiate a deal. Egypt, supported by Iraq, provides the bulk of the money. In return, both countries will eventually be able to produce their own Condor missiles in the Middle East. Abu Ghazalah himself oversees the Egyptian production of Condor at factory 17, a military site north of Cairo. Documents obtained by "Panorama" reveal for the first time the agreement between Argentina and Egypt on the BME, Ballistic Missile Egypt program, another name for Condor. This letter to Abu Ghazalah from Raoul Thomas of the Argentinian Defense Department refers to the cooperation between the two countries. A second letter confirms contracts have been signed.

Intelligence sources fear that Iraq's participation in the Condor project is linked to her interest in chemical warfare. These pictures were taken at Halabjah, the Kurdish town captured last year by Iran in the Gulf war. Iraqi jets dropped nerve agents and mustard gas on the people. [video shows nerve gas attack and victims] When the poison clouds cleared, hundreds of bloated bodies littered the streets. Condor could drop hundreds of kilos of deadly gas on civilians. Iraq has shown its willingness to use not only chemical weapons but missiles, too. Scud rockets were fired against Iran in the Gulf War.

The Israeli Military say Tel Aviv is vulnerable to Condor missiles launched from both Cairo and Baghdad, missiles that could be equipped with chemical warheads.

[Major General Ehud Barak, deputy chief of staff, Israel Defense Forces] In some sense, the growing focus of the world public opinion about this issue is dealing, you know, with the point of closing the barn door after the horse has already run away, but the use of these missiles during the Iraq-Iran war and the use in the same war of chemical warfare agents—even if not by missiles—makes the whole problem more severe and more serious for the future.

[Corbin] Until now, the Israeli Air Force has reigned supreme in the skies of the Middle East, but Condor could change that. The missile flies seven times faster than a jet fighter. As yet, there's no real defense against it—no star wars shield—except to build more missiles to retaliate with. Though Israel won't admit it, she has developed her own missile capability. This rocket race alarms the West: The chemical dimension is an added fear.

[Dr Steve Bryen, director, Pentagon Technology Security Agency, 1981-88] Our understanding of the Condor system is that it's not an especially accurate missile, so that being fitted with a conventional warhead or with a nuclear warhead, it, it—we wouldn't hit the broadside of a barn, we say—it's just not a very keenly accurate system. It might much more be suited to carrying a chemical warhead where—as a terror weapon—and it has all the flavor of being that sort of system.

[Waldegrave] It's all too easy to imagine a scenario, for example, in the Middle East, where you might get the Israelis believing that they were threatened by weapons that could only be effectively surprise attack weapons; that is, they wouldn't have any purpose as defensive weapons, and that the Israelis on past [word indistinct] might take that as an invitation to make preemptive strikes, and I think there is a clear step downwards toward the abyss in spreading these kinds of missiles.

[Corbin] The Condor story begins in 1980 on the shores of a Swiss lake: This is Zug, a peaceful canton, which owes its prosperity to discreet Swiss banking. From here, a group of companies affiliated with the German conglomerate Bolen Industries provided technology for the Condor project. Outside a large house above the lake, signboards proclaim the home of Consen S.A.; its sister company, IFAT; and subsidiary, Desintec. Consen's staff is somewhat shy of publicity.

[Corbin] Excuse me, I wonder if you can give me any information about this company, Consen?

[Unidentified Consen employee] I can't give you any information, I'm sorry.

[Corbin] Consen's headquarters in Zug is at the heart of a network of companies set up to service the Condor project—companies in Argentina, Germany, Monaco, Austria, Jersey, even one in England. For 7 years now, intelligence agencies in Britain, America, and Israel have been trying to piece together the jigsaw of the Consen connections to find out exactly how Western missile technology is being diverted to build the Condor.

Opposite Consen's office lives the man behind the company, Helmut Raiser, a German engineer. He was at home when we tried to ask him about Condor: He didn't seem keen to speak to us, either. Mr Raiser has extensive contacts in Argentina—he set up the original Condor deal. Intelligence sources call Raiser and his colleagues technomercenaries—men willing to sell their expertise for the highest price.

[Aaron Karp, Stockholm International Peace Research Institute] They're obeying the oldest commandment in the arms market, which is that if you don't sell, somebody else will: If there's money to be made, I might as well be the one to make it. That's the general attitude, and clearly, that's what was happening here. In all their public statements, the individuals who are supposed to be involved have always said that: What they do with the missile isn't our business.

[Corbin] In the letters confirming the cooperation between Egypt and Argentina on the Condor missile deal, IFAT—Consen's sister company—is named as general contractor.

[Karp] Around 1984 the Argentine program became fairly well-known in missile circles, and the foreign engineers that were most heavily involved—apparently from West Germany—began to bring the two countries, Egypt and Argentina, together. In the one, they had a client who wanted to build a missile; and in the other, they had a nation without the technology, but who wanted to buy, and the Germans seemed to have been the key brokers there—although both governments clearly were very interested themselves.

[Corbin] By the mid-1980's, the Washington administration and its Western allies realized they no longer controlled what had been an exclusive missile club. Alarmed about Third World missile proliferation and concerned at the part played by European companies in transferring technology, they decided to act.

In 1985 the United States administration persuaded Western governments to lay down informal guidelines to stop the spread of missile technology to Third World countries, and, in April 1987, President Reagan announced that seven industrialized nations—including the United States, Britain, Germany, and Italy—had signed a formal missile technology control regime. The MTCR, as it is called, requires its signatories to impose export controls on the technology needed for missiles. It

was intended to stop countries like Argentina from developing projects like the Condor. The MTCR may have slowed such programs down, but it hasn't stopped them.

[Quayle] It is a good faith effort to move forward and say: How can we deal with this in a collective way? I can say this: That if we did not have the missile control regime, the situation would be far worse than it is today. The situation has gotten worse, in a sense, but it would have gotten much worse if we did not have this regime that is seriously looking at the problem, offering remedies.

[Corbin] Until recently, Dr Steve Bryen headed the Pentagon department that polices the transfer of missile technology—an impossible task, he says. Each country has different export restrictions, and existing laws can't prevent the transfer of knowledge or restrict the movement of individuals.

[Bryen] I, I'm not clear in my own mind, the degree to which we in the West are really serious about controlling missile technology. I think we're serious about trying to convince the public that we're controlling missile technology, but if we want to be serious, we sure are doing it the wrong way—in terms of implementing a regime that can work. Missile technology agreement is a promise without institutions: It's a promise without laws, and its unenforceable.

[Corbin] The countries developing Condor, and the technomercenaries of the Consen group, were determined to get around the new rules. Last summer, California was the scene of a daring attempt to smuggle missile components out under the noses of the U.S. authorities. On 19 March 1988, American Airlines Flight 123 arrived in Sacramento. Among the passengers was an Egyptian, Colonel Algamal. He was met by 'Abdelkader Helmy, an Egyptian scientist living in California. Unknown to them, they were being followed by customs agents. Helmy drove his guest to a local motel, the La Quinta Inn. Customs had a tip-off that 'Abdelkader Helmy was smuggling missile parts to Egypt. He was a rocket scientist with Aerojet, a company involved in the U.S. space program. Helmy was using his security clearance and access to classified information without the knowledge of his employers. Helmy lived in the hills above Sacramento. Agents who followed him there the afternoon Algamal arrived saw Helmy storing several large cardboard boxes in his garage. These boxes accompanied the two men on a flight to Washington 2 days later, where it became clear this operation involved the Egyptian Embassy. Algamal and the boxes were driven by diplomatic car to a house on T Street, used as a residence for embassy employees. Algamal returned to Cairo, the boxes stayed in the embassy.

A court order allowed customs to tap Helmy's phone. "Panorama" has obtained the transcripts of Helmy's conversations with his control, Colonel Youssef, an

Egyptian diplomat in Austria. Helmy complained that the shipping clerk in the Egyptian Embassy was asking awkward questions.

[Begin reconstruction of Helmy conversation in Arabic, fading into superimposed English] I told him these items are controlled, they can't be exported outside the United States. I told him if they knew I'm buying it to export, I'll be thrown in jail. I said to him, we're acquiring the material for a special purpose, and no one knows about it except the minister.

[Corbin] The minister is believed by intelligence sources to be a reference to Abu Ghazalah, Egypt's defense minister. Phone taps, surveillance, and a painstaking examination of Helmy's dustbins, reveals an extensive shopping list of chemical and technical components—in the words of one expert, a complete package to build or upgrade a tactical missile system. The companies that Helmy approached were unaware that the materials were destined for export to a Third World missile program.

The content of the boxes was revealed as carbon-carbon, a material that wraps around the missile's nose to protect it from the intense heat of reentry. Two missile nose cones were on the list, a microwave telemetry antenna suitable for a tactical missile system, and rocket fuel ingredients: antioxidant 2246 and powdered aluminium, MAPO, a rocket propellant component, and Versimide 125, a rocket glue.

[John C. Kelly, U.S. Customs] As soon as we realized the technology, we knew we were dealing with something very large, and, when we introduced, or were able to identify the fact that you had diplomatic types tied to it, we knew that it was a very sensitive investigation.

[Corbin] Customs had to act when phone taps revealed the boxes had been taken to Baltimore airport. They were seized as they were being loaded onto an Egyptian Air Force flight to Cairo. Helmy will stand trial in August for conspiracy to violate export control laws. Abu Ghazalah's part was played down. Egypt is a major U.S. ally. The affair was embarrassing for both countries.

[Karp] Carbon-carbon is used at the two hot ends of the missile, the reentry vehicle and the engines, the guidance systems down by the engines, the steering veins, and such. Those are two key areas and there are no easy substitutes; there are no obvious technologies to turn to, and these are not things that Third World countries can manufacture themselves. They've got to get it from somewhere. And what the case showed was that these countries will turn anywhere, even to stealing from very close allies in order to get the technology they need.

[Corbin] Helmy's dustbins revealed that the Consen-IFAT group was financing this smuggling operation. IFAT wired checks for over a million dollars to Helmy's account via a German bank. Two months later, the technomercenaries received a warning: Their activities hadn't gone unnoticed.

At 0300 hours on 8 May 1988, in the square in Sparacède, a village in the south of France, a Peugeot car belonging to Ekkhard Schrotz, a wealthy German living there, was destroyed by a power bomb. [video shows car destroyed by bomb]

[Unidentified woman in French, fading into superimposed English] The car literally exploded, and my car next to it caught fire. The police carried out an investigation but we weren't told anything. Mr Schrotz is a German businessman who has lived here quite a few years. He has a company called Consen with a head office in Monaco. He was the real target of the attack.

[Corbin] This is the home of Ekkhard Schrotz. [video shows still picture of house] There are no pictures of this shadowy German engineer who took over from Helmut Raiser as Consen's general manager. Intelligence services say Schrotz is the Mr Fixit of the Condor project. An obscure group, the Guardians of Islam, said they planted the bomb because Schrotz sold rockets to Iraq, the enemy of Iran, but some believe Mosad, the Israeli secret service was responsible. Whoever it was, the message was clear: Stop the Condor project.

The bombers knew that Schrotz was channeling technology through a second Consen office in Monaco, a tiny but wealthy principality where no one inquires too closely into a company's dealings. Schrotz entertained engineers and military officers from Argentina and Egypt at the Beach Plaza Hotel. Condor clients prepared to pay many times the going rate for missile technology. Today Mr Schrotz spends his time behind the walls of his villa in Sparacède, protected by cameras and electronic gates, and by local gendarmes, who have advised him not to talk to journalists. Visitors are threatened with arrest. Mr Schrotz is a frightened man. So, too, is his caretaker, the man who normally drove the Peugeot.

[Caretaker in French, fading into superimposed English] Listen, when you see your car burning in the middle of the night, it has an effect of you. I don't want, I can't say anything, because I don't want it to happen again. I've got nothing to do with it. I'm not involved in all this. I'm just the man's chauffeur. It's dangerous to stir all this up again. People's private lives are at stake.

[Corbin] Since the car bomb, the Consen group worldwide has tried to keep a low profile. But we've traced nine companies, four in Argentina, five in Europe, involved in the Condor project.

Consen and IFAT, the main companies, are still based in Zug. But a third company, in Salzburg, Austria, is now active in the missile's development. This company is called Delta Consult. We visited Delta Consult in Salzburg.

We understand that this company is involved with the Condor project, with missile technology.

[Unidentified man] This is definitely not.

[Corbin] Do you have any connection to the Consen group?

[Man] No, definitely not.

[Corbin] To IFAT?

[Man] No, definitely not.

[Corbin] But Austrian business registers confirm the major shareholder in Delta Consult is IFAT. Neither Austria nor Switzerland is a signatory to the missile agreement, but Germany is, and the Consen group has a majority holding in a German company, PBG, located in Freising, a town north of Munich. Intelligence services believe these Consen companies have acted as a conduit for technology and expertise from some of Europe's biggest defense contractors who've supplied the launch track for Condor 2, elements of the guidance system, the engines, and the specialist fuels needed for them, and equipment for assessing the missile's performance. "Panorama" has obtained Consen internal documents dated after the missile control regime was implemented. These name and number the companies, describing them as most important in cooperation and as subcontractors. First on the list is the giant German industrial group Messerschmidt-Boelkow-Blohm. [video shows commercial for MBB]

MBB is Germany's largest aerospace group, a partner in the European Airbus, and one of NATO's chief contractors. The company, based in Munich, specializes in making missiles. When we first approached them, MBB told us they had worked on Condor I, a civilian project, but said they withdrew in 1985, concerned about its military applications. The German Government backed their claim.

[Erich Riedl, FRG minister of state, Economic Affairs Ministry, in German, fading into superimposed English] The German firm MBB withdrew from the Condor project back in 1985, after information had been obtained to the effect that the project had acquired a military dimension. The firm did what was correct under the circumstances. More recent checks by the German authorities do not indicate that this situation has changed, so it would be fair to say that nothing illegal has taken place.

[Corbin] But, despite German assurances, the Israeli Government, for one, believes MBB has not severed all its links to Condor.

[Barak] We do know that MBB, the West German firm, is the overall ... [Barak changes thought] responsible for the overall planning of the project and for the [word indistinct] systems in it.

[Corbin] Do you have evidence that MBB has been involved in the Condor project?

[Barak] I have no evidence here in this room, but it is well known, I am sure, that every intelligence service in the Western world might find the evidence very easily.

[Corbin] MBB disputes this accusation of continuing involvement in the Condor project. But "Panorama" understands the part they've played is more significant than they're prepared to admit. One of the companies' divisions, MBB Transtechnica, specializes in missile programs and technology transfer. It provides rocket-testing laboratories and specialist engineers. To begin with, Transtechnica worked openly on Condor, but even after MBB says they began to pull out of the project, sources in this company say this division continued work in Argentina without the MBB chairman's knowledge. Transtechnica delivered a laboratory for measuring the missile's ballistic curve and worked on Condor's warhead.

This is the high-security Munich home of the elusive Adolph Hammer, former MBB head of military research, responsible for Transtechnica's Condor work, the man MBB sources says continued to work on Condor in Argentina. [video shows photo of home] Hammer is now a director of IFAT and works from Delta (?Consult's) Salzburg office. MBB have banned him from their premises. But intelligence sources say he maintains links to his old colleagues inside MBB who are still working on Middle Eastern missile projects. MBB management have refused to be interviewed. They've given us a short statement admitting now that the company carried out a feasibility study for Condor 2, a military project as late as 1987. They say they withdrew when they became suspicious about how Argentina intended to use Condor 2. However, MBB has admitted to us that it is still supplying parts for a missile research laboratory in Iraq, a laboratory due to go into operation this summer. It says that obtaining the necessary export licenses was not MBB's responsibility, and that no German regulations were broken.

The Iraqi missile laboratory MBB is involved in is near the town of Mosul. This top secret site is called Saad 16. These pictures were taken secretly at Saad 16. [video shows still photos of Saad 16 missile laboratory] Iraq claims the project is a civilian one, but Western agencies say it's a research laboratory for Condor and other missiles. This plan of Saad 16 shows launch pads, wind tunnels, a hanger for prototypes, and chemical laboratories. [video shows building plans] The building work begun in 1983 was supervised by a Germany company, Guildemeister Projector. "Panorama" has obtained a copy of the contract for Saad 16. [video shows picture of contract]. In it, the Iraqi Government confirms Guildemeister and its partner, MBB, will provide technical assistance in research and development. Attached is a detailed list of laboratory equipment, which experts say could be applied to missile research and production.

Guildemeister says it has obtained government clearance for what it believes to be a civilian project. Yet MBB and Guildemeister are supplying apparatus, including equipment for studying aerodynamics, fuel production, the flight path of missiles, and antennas and microwaves.

Back in Germany, MBB kept the Saad 16 contract secret, even from some members of the board like Klaus Mehrens, the representative of I.G. Metall, the metalworkers trade union. He heard rumors MBB had supplied rocket laboratories to Iraq and Egypt.

[Mehrens] We asked for information about these exports of MBB and we got information from the management, of course confidential information, and we heard MBB was involved in transferring technology that at least could be used, and was intended to be used, for military purposes, especially in a number of countries in the Middle East.

[Corbin] And what did MBB say was the reason it was still involved in this trade after Germany had signed a missile technology control regime?

[Mehrens] Well, concerning these countries in the Middle East, it said that this again went back into the past and was not under responsibility of the present management, and it itself felt concerned about that, it would like to move out of this business but was not able to because of, well, obligations it had according to the treaties it signed.

[Corbin] So the contracts are still ongoing?

[Mehrens] It seems they are. I think we're going to have more information in the very near future, but it seems that the contracts are still valid and still going, yes.

[Corbin] Why don't they cancel those contracts?

[Mehrens] Well again, we were told that this would cost the company a large amount of money, and for this reason it is not possible to withdraw from these contracts immediately.

[Corbin] The German Export Bureau polices the transfer of military technology, including that covered by the missile agreement. December's revelations that German companies were involved in a Libyan chemical weapons plant at Al-Rabitah caused this office and the government acute embarrassment. A note on a computer reminds them of that. The government says checks are tighter now, penalties tougher. With missile components, staff checks export applications against equipment controlled under the MTCR agreement. But a missile consists of hundreds of parts, many with civilian as well as military uses. This office depends on companies telling them what the parts going to places like Saad 16 are intended for.

[Corbin to Mehrens] Do you think the government knows of MBB's involvement? If so, why hasn't it acted sooner?

[Mehrens] It has become clear that the instruments of control that the government uses are not very effective, and my information is that all these contracts were licensed by the government. I don't know if the information the government received from MBB were detailed enough to make the right judgment, but I do not think that anything they transferred to those countries was really illegal. They feel very uncomfortable in the situation they have come in, and this is because they realize that even if the contract and the deal were legal, it's politically and morally a very doubtful business, and so I think it's correct to say that they violated the spirit of the German restrictions on arms exports, even if they got legal licenses.

[Corbin to Bryen] How far is it a question of political will in terms of stopping this kind of transfer?

[Bryen] I think it's entirely a question of political will. I don't think we need a missile technology agreement to prevent these kinds of transactions. We need the governments to tell their major defense contractors not to do this sort of thing. If they did that, that would be the end of it. There is not a doubt in my mind that if the German Government told MBB or any other German company that it didn't want them selling missile guidance systems or missile technology to Argentina or to Egypt or any place else they wouldn't sell it.

[Corbin] On inauguration day, the Bush administration declared the control of missile technology one of its top priorities. In this they're backed by Britain. Now the American Senate is pressing for sanctions against European companies that violate the missile agreement. Twice the U.S. authorities have asked the German Government for details of MBB's involvement in Condor, including the warhead. They're not yet satisfied with the answers.

[Corbin to Quayle] German companies have been named, the Messerschmidt company, for example. Are you and the United States prepared to pressure the German Government to do something about that?

[Quayle] We are very sensitive, and very informed on this particular issue. And when the matters of concern to this proliferation of ballistic missile technology can be documented and established, there is no doubt about it that there will be communications. I can certainly appreciate any country that wants to advance exports. But to advance exports, in fact, that are going to come back and be detrimental to that country is really counterproductive to their national security interests, not only to the national security interests of that particular country, but the national security interests of the entire West.

[Waldegrave] Well, it must be for the German Government to take action. I think that the German Government and a number of other governments are taking all this now very seriously, so I have some reasonable hopes of that. We discussed with our partners in the MTCR regime such information as we have, but it must be for the individual governments concerned to deal with their own companies.

[Corbin] Do you think that the German Government has failed to take a tough enough line so far?

[Waldegrave] Well, I think there were questions certainly put by the Americans before the Al-Rabitah affair, but I have to say that I think the German Government is now taking these matters very much more seriously.

[Corbin] The net is closing on the German Condor connection. Last Friday, 35 customs agents on the orders of the Munich prosecutors department raided two MBB offices in Munich and Schroebenhausen, and seven other locations. They're now investigating the Condor and other missile projects. Investigators raided PBG, too, looking for evidence to confirm their suspicions that this Consen subsidiary handled some of the Condor technology. And last month, Guildemeister was raided. Inquiries into its role in the Saad 16 Iraqi project continue. It's a critical time for MBB, which has been losing money. A lifeline has been offered in the form of a proposed merger with Dame Labens; the investigation is bound to affect that. The government now acknowledges that MBB may have been involved in Condor later than 1985, but until the investigation is complete, officials stand by what they told us before the raid.

[Riedl in German fading into superimposed English] According to our information, MBB does comply with the regulations. If it didn't, enormous damage would be done to the firm's reputation, and I wouldn't know anyone in the firm who would take such a risk. I can declare my trust in MBB, and I would be pleased if other Western governments were in a position to say the same things about their own firms under similar circumstances.

[Corbin] The superpowers are destroying their missiles, but the Third World is intent on acquiring these tickets to political and military status. The Condor, with its chemical warfare potential, is the beginning of a new generation of terror weapons. Thanks to European engineers, the Condor 2 prototype will fly in the next year. Then it will be for sale, and the West cannot control who will buy it.

[Karp] A weapons technology that used to be the monopoly of a few great powers has become something for any country with the money and the inclination. Now there are about 20 to 25 Third World countries trying to get exactly the same capabilities. And when they have that capability, the international balance of power will shift, and it will shift forever.



### **Local Workers Oppose Nuclear Sub Berth at Tilbury**

51500110 London THE DAILY TELEGRAPH in English 17 Mar 89 p 12

[Article by Adela Gooch, Defence Staff]

[Text] The Ministry of Defence is considering plans to provide berths for nuclear-powered submarines at Tilbury, Essex. Swansea is also on the list of possible sites for a new "Z Berth"—the code name given to docks equipped to harbour this type of submarine.

"It is prudent to have as many places where submarines can berth as possible" an MoD spokesman said yesterday.

"The Navy's requirements in this regard are continually under review. When a port appears suitable, we examine the potential further."

Z Berths exist at three commercial ports—Southampton, Liverpool and Cardiff. They provide useful alternatives to the submarine dock at the Navy's own bases at Portsmouth, Plymouth, Portland, Faslane and Rosyth.

A fourth, at Barry, in South Wales, has been temporarily discontinued.

Z Berths at commercial ports are used by nuclear-powered submarines only. The Navy's fleet of four nuclear-armed Polaris submarines are restricted to Navy bases.

Mr Jimmy Aberdein, the Labour leader of "nuclear-free" Thurrock Borough Council, said he did not like the idea of Tilbury "one bit."

Dockers leaders said the plan could end in disaster and predicted a second Chernobyl on London's doorstep.

Mr Keith Watson, the Transport and General Workers area officer, said: "There would be spontaneous action against any insistence of the MoD on placing nuclear submarines here."

"It is against the whole philosophy of the TGWU who are committed to unilateral disarmament."

### **Radioactive Incident Monitoring Network Opened**

51500111 London THE DAILY TELEGRAPH in English 17 Mar 89 p 24

[Article by Charles Clover, Environment Correspondent]

[Text] A radiation monitoring network capable of providing a fast information service in the event of another major overseas nuclear accident such as Chernobyl was opened in London yesterday by Lord Caithness, Environment Minister.

Under phase one of the Radioactive Incident Monitoring Network (RIMNET), radiation monitors have been set up at 46 Meteorological Office sites across the country and will be fed into a central computer throughout the day.

An alert will be raised if abnormal rises in radioactivity are detected and a coordination center set up at the Department of the Environment, staffed by civil servants and representatives of the national Radiological Protection Board and the Met Office.

Additional Government monitoring programmes will be set up as necessary, including monitoring of food, water, people and goods coming into the country from affected areas.

The RIMNET network is part of the Government's National Response Plan for dealing with any future overseas nuclear incidents announced by Mrs Thatcher in June 1987.

The number of RIMNET stations will be increased to between 80 and 90 under the second phase of the project, which will take around two years. In this monitoring facilities will be improved and automated and computer facilities upgraded.

Lord Caithness said: "The chances of another accident like Chernobyl are very remote. However, should one occur, we now have important additional tools to help deal with it in an efficient and effective manner."

"We have used the most modern information systems to ensure that the public and media are kept up to date with the latest situation and advice."

Phase one of RIMNET has been developed by a consortium of companies led by Logica, with Taylor Woodrow Management and Engineering Ltd and the Eberline Instrument Company.

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